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WINTER CROP PREPARATIONS IN BELORUSSIA

Minsk SEL'SKOYE KHOZYAYSTVO BELORUSSII in Russian No 7, Jul 79 pp 24-25

[Article by A. Ye. Osin, director of the department of variety agrotechnology of grain crops, BelNIIZ [Belorussian Scientific Research Institute of Grain]: "The Republic's Winter Field"]

[Text] Winter rye and wheat are the main food crops in Belorussia. In sowing area rye occupies second place, following barley, but within the structure of winter grains it is first. In grain productivity rye has been significantly inferior to other spike crops in the past. However, during recent years as a result of the extensive introduction of highly productive varieties the yield of rye has approached the yields of wheat and barley.

The significant growth in productivity of winter rye and wheat in the republic has been achieved through the improvement of the general quality of farming and through the introduction of highly productive varieties into production. The Belta and Khar'kovskaya-60 rye varieties have been regionalized here, and Belorusskaya-23 and Voskhod-1 have been recognized as promising. Last year we imported seed from the new Chulpan rye variety which was developed by the Bashkirskiy Scientific Research Institute of Agriculture. Its unique biological feature is its short stem.

This variety is a semi-dwarf. The plant does not exceed 1 meter in height on the average. The stalk is firm, which makes the plants very resistant to lodging. When cultivating Chulpan rye it is essential to maintain taller varieties at a distance of at least 800-1,000 meters. The new variety is characterized by a high degree of winter hardiness. During the overwintering period of 1977-1978 in variety plots in Belorussia and in 1978-1979 in our tests at the Zazer'ye Experimental Base the variety did not become infected with snow mold. The maximal yield in variety plots was 41.2-54.5 quintals of grain per hectare.

In Belorussia basically the winter wheat variety Mironovskaya-808 has been regionalized. With proper agrotechnology it secures large yields of grain. In a number of enterprises in Grodnenskaya, Brestskaya and Minskaya oblasts Mironovskaya-808 yields 45-60 quintals of threshed grain per hectare.

Many of the republic's farms are creating the best possible conditions for the growth and development of winter crops, producing large rye and wheat harvests yearly. For example, we have the 40 Let Oktyabrya Kolkhoz of Stolinskiy Rayon. During the last 3 years the productivity of winter rye has been an average of 46 quintals per hectare. In the Zarya Kommunizma Kolkhoz of Ivanovskiy Rayon during the same period 46.7 quintals of grain per hectare of the Mironovskaya-808 winter wheat variety were threshed.

It is planned to raise grain production in Belorussia to 9 million tons by the end of the 10th Five-Year Plan. A large role in meeting this goal will be played by winter crops.

What are the basic ways to raise the productivity of winter fields in the republic?

First, it is necessary to distribute winter rye and wheat correctly in crop rotations. In the republic winter crops are usually sown after fallow predecessors, flax and furrows of perennial grasses. We should consider occupied fallow (feed lupine for green mass, legume-grass mixtures), perennial grasses and the underside of furrows used for flax as good predecessors.

It is very important to prepare the soil on schedule and with quality. The closer the time of plowing is to the sowing period, the drier the sowing horizon becomes and it is more difficult to cultivate the soil to a fine consistency. The workers of BelNIIZ have determined that during years with the normal amount of precipitation there is a decrease in grain yield of up to 3 quintals per hectare in comparison with the optimal variant if clover furrows are plowed 3 weeks late. During dry years the loss is even greater.

When plowing fields for winter rye and wheat a roller must be used in a unit with the plow no matter when plowing occurs. Packing soil at the same time as plowing eliminates large clods of earth to a significant degree. Moreover, the process of soil packing is accelerated and the work of machine operators in subsequent operations is improved.

Pre-sowing leveling and packing of the upper layer of soil is mandatory. This method enables us to place 97 percent of the total amount of seed at the optimal depth. The number of plants on a level surface as compared to an unlevel one increases by 20-30 per square meter.

Winter crops require a good supply of nutritive substances in the soil. The use of organic fertilizers is particularly effective. In BelNIIZ tests on light loamy soils there was an increase in the grain yield of rye equalling 9.5 quintals per hectare with the introduction of 30 tons per hectare of peat manure. The manure has a positive effect on the soil and on the plant and encourages a greater plant hardiness during overwintering. In our tests over a 3-year period 89 percent of the plants overwintered successfully when manure was applied, 72 percent when NPK was used and 58 percent when no fertilizer was used.

An indispensable factor in obtaining a large yield of winter crops is decreasing soil acidity to the optimal level. Liming eliminates the negative consequences of acidic soils.

The dosage of phosphorus and potassium fertilizers is established according to the content of active forms of phosphorus and potassium in the soil. BelNIIZ experiments have shown that if there are fewer than 10 milligrams of P_2O_5 and 8 milligrams of potassium per 100 grams of soil the optimal dose of phosphorus is 80 kilograms per hectare and of potassium--90 kilograms per hectare. If the soil contains 10-20 milligrams of K_2O and P_2O_5 the dose of phosphorus is decreased to 60 and that of potassium--to 80 kilograms per hectare. If there are over 20 milligrams of these elements per 100 grams of soil the dosage is decreased to 45-50 and 60 kilograms per hectare respectively. Doses lower than this do not promote a large yield. All of the potassium and most of the phosphorus are applied during plowing or pre-sowing cultivation. A very effective method is the row application of granulated superphosphate during sowing at a rate of 10-15 kilograms per hectare of phosphorus in active substances.

Winter crops have a long vegetative period, which determines the special requirements for nitrogen supplies. In practice the republic's kolkhozes and sovkhozes have made 30-40 kilograms per hectare of nitrogen fertilizer the norm for low-productivity soils, if there is an insufficient amount of previously applied organic fertilizer for predecessors and for winter rye directly, and if the predecessor is barley.

If winter crops on cultivated lands are raised after well-fertilized predecessors--after perennial grasses and annual legume crops--then the fall application of nitrogen fertilizers should be eliminated.

The sowing rate is important in the complex of agrotechnical measures that are directed at obtaining large yields of winter crops. BelNIIZ tests have determined that on sod-podzol average loam soils the best sowing rate for winter rye of the Belta variety is: on a poor background ($N_{30}P_{45}K_{45}$)--5 million, on an average background ($N_{60}P_{90}K_{90}$)-- 4 million and on a rich background (peat-manure compost of 30 tons per hectare plus $N_{60}P_{90}K_{90}$)-- 3 million germinated seeds per hectare. For Mironovskaya-808 winter wheat the corresponding figures are 6, 5 and 4 million.

On the basis of long-term experiments conducted in various soil-climactic zones of Belorussia as well as of the experience of cultivating winter crops in leading enterprises in the republic, the optimal sowing rate for winter crop seeds depending upon the level of soil productivity and the dose of applied fertilizers on mineral soils should be considered: Belta rye--from 4 to 5 million germinated seed per hectare; diploid varieties--5-6 million; and winter wheat--4.5-5.5 million. On peat bogs the sowing rate for rye is decreased to 3-3.5 million and for wheat to 3 million germinated seed per hectare.

The long-term data of scientific institutions and the experience of leading enterprises have determined that the best time to sow winter rye on mineral soils is: for the northern zone--1-10 and for the southern zone 5-15 September; on peat bogs 5-15 and 10-20 September respectively. For winter wheat the optimal period in the first case is 1-5 and 5-10 September and in the second--5-10 and 10-15 September. On more fertile soils winter crops should be sown during the second half of the recommended time period.

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PREPARATIONS OF WINTER FIELDS IN BELORUSSIA

Minsk SOVETSKAYA BELORUSSIYA in Russian 4 Sep 79 p 1

[Editorial article: "The Republic's Winter Fields; a similar article was also published in JPRS 74328, No 1202 dated 12 Sep 79 pp 11-14 of this same series]

[Excerpts] The optimal time for sowing winter crops has arrived. Rural workers have always and continue to attach exceptional importance to this period. Winter rye and wheat, our main grain crops, occupy a solid position in total grain production--over one-third of gross yield. Many kolkhozes and sovkhozes which complete the entire complex of agrotechnical measures on schedule and with good quality produce large yields of these crops each year.

Today many kolkhozes and sovkhozes are expanding their areas in winter crops. In the republic as a whole the winter grain field will increase by 50,000 hectares over last year. We must sow seed rye and wheat on over 1,200,000 hectares of arable land. It is perfectly clear that the harvest and gross yield of grain next year will depend greatly on the schedule and the level of completion of fall sowing operations by farmers.

In plenary sessions of the Central Committee of the Belorussian CP and in the speeches of P. M. Masherov, candidate for membership of the Politburo of the Central Committee of the CPSU and first secretary of the Central Committee of the Belorussian CP, attention was focused more than once on gross technological violations during the sowing of winter crops that are tolerated by many kolkhozes and sovkhozes. The basic shortcomings are related to the fact that fields are not fully supplied with organic and mineral fertilizers, that they are cultivated poorly, that leveling and packing operations are not always performed. This results in a great sparsity and even in the death of winter crops on large areas. To perform model work, to prepare and sow each field on a high agrotechnical level and to lay a stable foundation for the future harvest--these are the battle goals of farmers and of directors and specialists of enterprises and party, soviet and agricultural. organs.

Meanwhile, despite the fact that the optimal sowing period has arrived, in many kolkhozes and sovkhozes significant areas for rye and wheat still have not been readied for sowing. In Brestskaya oblast, for example, one-fifth of such land areas still remains to be cultivated in a number of rayons.

Each kolkhoz and sovkhoz must immediately prepare the soil for winter crops. Pre-sowing soil cultivation must be given special attention. It must be performed with extreme care, and agronomists-field technologists are primarily responsible to make sure that this is done.They like no one else know what the pre-sowing leveling and packing of the upper layer of soil means for a good harvest. Today this work is made easier by the fact that it is possible for all enterprises to have pre-sowing cultivation of fields using combined units of the RVK type, and it is mandatory that they be used everywhere.

This year it is also essential to significantly increase the application of organic and mineral fertilizers. Quantity is not the only problem. Each sovkhoz and kolkhoz must follow the example of leading enterprises in utilizing differentiated, scientifically-based doses of fertilizer. These are based on the level of the planned harvest, the supply of nutrients in the soil and the biological peculiarities of the particular variety. We cannot tolerate the fact that in a significant number of enterprises a dangerous practice has taken root, that of applying fertilizer on the average per hectare and not according to a consideration of the specific field conditions. Specialists feel that as a result of this alone there is an [illegible]ation of 3-5 quintals per hectare. We cannot disregard this kind of reserve.

Winter crops are very responsive to organic fertilizers, even more so than spring crops. However, most farms still strive to apply more compost to barley than to winter crops. Of course this is illegal. Shortcomings must be corrected decisively and the application of organic fertilizers to fields of winter crops must be improved overall.

In the republic fall sowing is growing more extensive and is gathering speed. It is essential to secure the highly productive utilization of all soil cultivating and sowing technology. Everything possible must be done to make sure that each hectare of winter crops is sown at the optimal time with adherance to all agrotechnical requirements. Only in this way will it be possible to lay a firm foundation for achieving the planned productivity of grain crops for next year.

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HARVEST PREPARATIONS IN BELORUSSIA

Quality Agrotechnology Urged

Minsk SEL'SKAYA GAZETA in Russian 9 Sep 79 p 2

[Article based on operational survey by the BSSR Ministry of Agriculture: "High Quality Agrotechnology for Sowing Winter Crops"]

[Excerpts] This year the kolkhozes and sovkhozes of the republic will expand the area in winter crops for grain purposes to 1,214,000 hectares including in rye to 1,100,000 hectares, which is 63,000 hectares more than last year.

In the republic 40 percent of grains are winter crops. In rayons located on light soils over half of the grains that are cultivated are winter crops. For this reason special concern must be demonstrated about winter fields in order to secure large harvests from each hectare. In leading enterprises of the republic, where the entire complex of agricultural measures for the cultivation of rye and wheat is observed, large harvests are produced each year.

As of 8 September in the republic winter crops for grain purposes were sown on an area of over 600,000 hectares, or on 50 percent of the planned area.

In some enterprises plans for the use of fertilizers were composed formally, without a consideration of the availability of nutrients in the soil and the planned harvest level. When mineral fertilizers are applied, the scientifically-based proportions of nutritional elements are not adhered to. There is no careful regulation of machines for the uniform application of the required norm of fertilizer. As a result the fertilizer is applied in strips.

Such facts have become possible because some agricultural administrations of rayon executive committees have lowered their demandingness toward kolkhoz and sovkhoz directors and specialists regarding the strict observance of technological discipline during the sowing of winter crops. They have weakened controls over the completion of the work.

In the northeastern rayons of the republic the optimal sowing period is now on the wane. For this reason the agricultural administrations of oblast and rayon executive committees must initiate strict controls over the organization of operations for fall sowing and secure the highly-productive use of each sowing unit in order to sharply increase the pace of sowing operations and to raise their quality. The agronomic service should pay special attention to strictly observing all agrotechnical rules, especially the careful leveling of land, the sowing only of well-calibrated and treated seed, the uniform application of mineral fertilizers in the soil, the mandatory application of granulated superphosphate in the rows, and the daily technological adjustment of sowing machinery.

Each kolkhoz and sovkhoz should complete work and provide an evaluation of its quality. The final reception of fields should be completed after shoots have appeared, and special committees should be formed for this.

It is necessary to organize the operations of sowing units everywhere during daylight hours and to secure their movement in the fields using the shuttle method with markers or route indicators. In units with sowing packers sowing should be completed by 10 September in the northeastern rayons, by 15 September in the central and by 20 September in the southwestern rayons.

It is the duty of the republic's grain farmers to do all that is necessary to complete sowing on schedule and on a high agrotechnical level and to lay a firm foundation for producing a large harvest of winter crops during the final year of the 10th Five-Year Plan.

Preparing for Future Harvest

Minsk SEL'SKAYA GAZETA in Russian 21 Sep 79 p 1

[Editorial article: "Preparing Today for the Future Harvest"]

[Text] There is no respite for farmers in the fight for the harvest. Each day is subordinated to this goal. They are constantly carrying out their difficult and responsible work in the main shop of the country producing the basic treasure--grain. Today the gathering of the harvest for the fourth year of the five-year plan has not yet been completed but the thoughts and activities of the rural worker are already directed at making the next harvest an even greater one.

The winter fields yield a significant portion of our total grain. In the republic this year they are being expanded to 1,214,000 hectares. Rye will be sown on 1,100,000 hectares, an increase of 63,000 hectares over last year. The sowing of winter crops is basically completed. This year it was performed on a higher agrotechnical level than in previous years. The best predecessors were selected, the soil was well prepared and organic and mineral fertilizers were applied, and the optimal sowing schedule was maintained for sowing using high-quality seed. Work was performed with high quality.

Already today we must be concerned with the spring fields and primarily with the seed fund. The directors and specialists of many enterprises have remembered this from the start of harvesting operations, when the grain was moved from combine bunkers to threshing floors and treated immediately. Nevertheless, in the republic as a whole the fill up with grain crops for the next harvest still has not been completed. The enterprises of Brestskaya Oblast have completed this phase of operations, but in Gomel'skaya Oblast over one-tenth of the required quantity of seed grain still has not been stored. Many kolkhozes and sovkhozes do not have the opportunity to supply themselves with their own high-quality seeds. The BSSR Ministry of Agriculture and its local organs must extensively organize inter-rayon and inter-enterprise grain shipments. There must also be a more persistent and active management of grain procurement for state resources.

Now is the time to think about the quality of seed funds. We cannot tolerate the errors of past years, when seed preparations in some places practically awaited spring. This work must be completed immediately so that selected high-quality seed is stored. Measures must be taken to guarantee its preservation.

There is also an acute shortage of seeds of legumes today. We must complete the harvesting of these crops more rapidly without tolerating losses and work with the seeds skilfully.

Within the complex of fall harvest measures an important place is occupied by the turning of the plowland. Plowing must be completed by the first half of October at the latest and the maximal amount of organic fertilizer should be applied. The data from scientific experiments and from progressive practices indicates that the early and quality cultivation of the soil during the fall has a positive effect on raising the productivity of crops. The enterprises of Gomel'skaya Oblast have been most successful in plowing operations. Here almost two-thirds of the planned area has already been plowed. In Vitabskaya Oblast only one-fifth of the total area has been plowed. Two 10-day periods of September have already passed and plowing has hardly begun in the Rassvet, Znamya Lenina, Rodina, imeni Frunze kolkhozes, the Tulovo experimental base and the Luzhesna teaching farm of Vitebskaya Oblast. This slowness can result in significant losses of harvest yield. The conclusion is evident: to increase the pace of work everywhere in order to utilize the optimal schedule.

We must seriously consider the procurement of organic fertilizers and the quality of compost. Each enterprise must make sure that peat is never applied to the soil in pure form, but that it is always utilized through livestock-raising facilities. Mechanized detachments and links should be formed ahead of time for the procurement and shipment of organic fertilizer. They must be supplied with dependably-repaired equipment. The work volumes and schedules must be established and the measures for moral and material incentives for the victors of socialist competition must be determined. Everything must be subordinated to the main goal--to provide spring fields with the quantity of organic fertilizers that will guarantee the unconditional production of the programmed yield for all crops.

The optimal time for liming has arrived. Plots are freed from predecessors readily. The most distant farms and the farthest fields will be supplied with technology. The workers of the enterprises of Sel'khoztekhnika [Agricultural Equipment Association] must make immediate use of these exclusively advantageous conditions to fulfill the goals for the neutralization of acid soils, which will also serve the new harvest to a considerable degree.

Yes, the grain farmers have many concerns today. Just as they did yesterday. Just as they will have tomorrow. The harvest is not made in one day. It requires constant concern, work days of continuous labor and tireless searches.

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HARVEST PREPARATIONS IN UKRAINE

Moscow SEL'SKAYA ZHIZN' in Russian 22 Nov 79 p 1

[Article by A. Soldatskiy, Khersonskaya Oblast: "So That the Ear is Filled"]

[Excerpts] In Khersonskaya Oblast 779,000 hectares will be sown in winter crops this year. Sowing was completed at the optimal time on the entire area, and after the October frosts there was a great thawing with beneficial rains. Even shoots appeared. Their fate now depends on the type of winter we will have.

But farmers are not depending on the weather alone. Since early fall they have been caring for the crops by means of top-dressing. It is true that for large areas the farms do not have enough hard forms of nitrogen fertilizers, but a solution has nevertheless been found.

"When we noticed that winter crops were starving, we decided to use ammonia water for top-dressing," says the senior agronomist of the Chaplinskiy Rayon agricultural administration, G. K. Rozdymakha.

In this rayon 66,000 hectares are in winter crops. This is significantly more than planned. On 54,000 hectares the crops are entering winter in good condition. Usually they develop well in the remaining areas as well as a result of the concern of grain farmers. One goal is to top-dress as many plants as possible starting in the fall. For this purpose airplanes and helicopters of agricultural aviation, mineral fertilizer spreaders and disc sowers are being utilized. The application of fertilizer in the root horizon yields the best results. This method has been used to top-dress a total of 8,200 hectares.

The late fall in the southern Ukraine did not diminish the concern of farmers. The plowing of late-fall plowed fields and the repair of technology are continuing. Crop care is still the priority concern. For the first time they are being top-dressed with ammonia water with the aid of special units prepared by the enterprises. Experience has shown that with this method we can increase yield by up to 4 quintals and destroy the grain ground beetle. The fields that are infested with this pest are top-dressed first.

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KUYBYSHEV POTATO, VEGETABLE STORAGE PROBLEMS, IMPROVEMENT

Moscow TRUD in Russian 2 Dec 79 p 2

[A "raid" article by TRUD's raid brigade, consisting of V. Gaplykov, chairman of working correspondents council, V. Burla and I. Litvinov, public correspondents, Kuybyshev: "Should There Be Order at the Depot--A Trud Raid"]

> [Text] At the storehouse of Kuybyshev City Trade Organization for Trade in Fruits and Vetetables, there are stored about 22,000 tons of potatoes, more than 10,000 tons of cabbage, thousands of tons of carrots, table beets, onions, garlic and other vegetables. The problem now is to preserve this wealth with care and to provide the city's dwellers with an uninterrupted supply.
>
> This raid of TRUD's public correspondents dealt with the situation at the vegetable depots.

At the first depot's No 4 warehouse, tens of thousands of tons of potatoes and vegetables are stored. A total of 20 men work here, yet this small collective successfully handles preparing produce and sending it to the trade network. The explanation is simple: first, the container method of storage is widely used here; second, there is equipment to help the people. The warehouse is equipped with suction and exhaust ventilation, refrigeration equipment, automatic loaders, machines for sorting potatoes.

"In the newspaper TRUD there appeared a news item 'An Ordinary Miracle,'" Ye. Falga, director of the trade organization, says. "With a group of specialists we took a trip to Kurgan where we studied their work experience. As a result, we found much that was useful, some of which we have already started to introduce here and there. For example, we fabricated and are successfully using four 30-ton automatic dumpers. This has actually enabled us to release hundreds of hands from unloading work."

"We are helped by students, plant and factory workers in the going over, sorting and unloading of potatoes and vegetables," R. Namestnikov, the depot's senior storekeeper, says. "But it would be better for us to have permanent strong sponsors, who would help in the renovation of storehouses and in the mechanization of work."

They told us at the city fruit and vegetable trade organization that they have good ties with the collective of the Metallurgical Plant imeni Lenin and several other enterprises of the city's Oktyabr'skiy Rayon, which provide skilled and effective help. But, unfortunately, this as yet has not become a system in Kuybyshev, for which reason the level of manual labor is high in vegetable storehouses, and many people are involved in sorting and selection.

Help is needed, but more of an industrial kind rather than "manpower." For example, at the large No 3 depot, there is an acute shortage of sorting machines and loading-unloading equipment, which holds back the development of store of vegetables in containers. As a result, a lot of the potatoes are simply stored here in piled form. Even now, these tubers are in need of being sorted out as they show signs of spoilage. And this at the very beginning of winter!

The city fruit and vegetable trade organization supplies the stores of all of the city's rayons except one--the Kuybyshevskiy. Here the storage of vegetables and trade in them is entrusted to the rayon combined trade organization. We visited the vegetable depot of this trade organization, which stores 860 tons of potatoes and hundreds of tons of vegetables.

"In order to take care of such a quantity of produce," A. Bochkarev, the director of the depot, told us, "we have to put up with a deterioration of the conditions of its storage. Let us say that we place potatoes in a bin to a height of 150-180 centimeters, while according to regulations it should be up to only 120 centimeters. Because of this there is an increase in the quantity of spoiled potatoes. Storage in containers is out of the question. In such a case we would be able to store only about 200 tons of potatoes.

In appearing at a recently held plenum of the CPSU Central Committee, Comrade L.I. Brezhnev emphasized that it is necessary to work for uninterrupted coordinated operation of all parts of the chain which links field or farm to the consumer. Here everything is equally important, he said, transport and packing production, storage and sorting of products and, finally, trade.

The city's fruit and vegetable depots are now starting the winter without a a doubt more successfully than formerly. Potatoes and vegetables have been stored in quantities that are adequate to provide the population with them till the new crop. But many problems still exist in regard to the quality of storage. For them to be successfully solved, much could be done by the city's industrial enterprises. This is in the interest of their collectives: there would be more good-quality produce in the stores, fewer people would be diverted to heavy manual work in the storehouses. The practicability of this way is shown by the experience of the Kurgan people. A lot could be done here by trade-union committees and the oblast trade-union council.

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SOY BEAN-RICE CROP ROTATION IN KZYL-ORDINSKAYA OBLAST DISCUSSED

Alma-Ata SEL'SKOYE KHOZYAYSTVO KAZAKHSTANA in Russion No 9, Sep 79 pp 16-17

[Article by K. Zhaylybayev: "Soy Beans in Rice Crop Rotations"]

[Text] Soy beans are one of the most valuable bean crops. They are of great food, industrial and animal feed value. The beans contain 36-48 percent protein and 20-26 percent oil. They are of enormous importance in strengthening the feed base of public-sector livestock production. In terms of its protein content, its yield in feed units and the amount of phosphorus, calcium and carotene it contains, the hay is not inferior to alfalfa, sweet clover and cereal grasses. A quintal of the hay contains 47-54 feed units, which include 11-15 kilograms of digestible protein. Including soy beans inthe livestock ration not only balances its feed with respect to protein, amino acids and minerals, but also supplements it with vitamins and enzymes and enhances the digestibility of other feeds.

It is this which, to a great extent, dictates the necessity of expanding the area sown with soy beans along the lower reaches of the Syr-Dar'ya, which may, and must, become a region of the commodity production of this crop. For the most favorable conditions are to be found here. Our tests confirm that with the proper selection of varieties and the maintenance of a high level of farming practice, we may obtain 25-28 quintals of beans and 250-330 quintals of green bulk per hectare. As studies have shown, the highest yields are to be obtained from the Vysoko-stebel'naya 2, Mutant 359, Gibridnyy 670 and Primorskaya 529 midseason- and mid-to-late-season-maturing varieties.

The advantage of soy beans also consists in the fact that, in consequence of its symbiosis with nodule bacteria, they leave 45-110 kilograms of nitrogen per hectare of cultivated area (which is the equivalent of the application of 12-24 tons of manure). This has an impact on rice yields. With rice preceded by soy beans, they are 3-8 quintals per hectare higher than they are with rice as the single crop.

When including soy beans in a crop rotation, consideration must be given to the effect on them of their predecessor and to their relationship to the soil. This crop poorly withstands salinization and solonetzic and weedy soils, especially soils infested with velvet grass-type weeds. In connection with this, it has to be cultivated in areas of nonsaline soil free of weeds. As part of a rice crop rotation, soy beans may be cultivated in meliorative soil.

Rice-producing organization should establish on-farm feed crop rotations in the vicinity of their cattle barns and feeding facilities. The best predecessors for soy beans in such instances would be perennial grasses and virgin and fallow lands.

Soy bean cultivation possesses its own unique characteristics. This crop has to be provided with nutrients throughout its entire vegetative stage. This requires the application of 3-5 quintals of superphosphate in the fall to fall-plowed fields. Soy beans are also very responsive to organic fertilizers. It is therefore advantageous to apply them to soil for second-year rice cultivation. If this has not been done in the fall, 10-15 tons of manure and 3-4 quitals of superphosphate should be applied per hectare in the course of presowing soil cultivation operations.

Soy beans require thorough cultivation of the soil for their normal development. We have been beginning soil preparation operations in the fall with fall plowing to a depth of 25-28 centimeters. We harrow the field early in the spring and then carefully microlevel the check plots using rails and D-719 or M-6 long-base levellers. We then apply manure and superphosphate. We apply the fertilizers using heavy disk harrows to a depth of 10-12 centimeters. We cultivate 2-3 times prior to sowing, the last time to a depth of 6-7 centimeters before planting the beans. These agricultural methods help eliminate pestiferous weeds and contribute to the best formation of nodule bacteria on the roots.

Treatment of the sprouts with herbicides plays an important role in the weed-killing program. We treat the soil with linuron after the completion of the sowing and 4-5 days before the appearance of the plants. It kills such weeds as the Japanese millet, yellow foxtail and others. Linuron's effectiveness depends on the humus content of the soil, its moisture and its mechanical composition. On the swampy grasslands of the lower Syr-Dar'ya, which have a humus content of 1.5-2 percent, the herbicide should be applied at 1.6-1.8 kilograms of active substance per hectare. It is not advantageous to apply linuron to sandy soils (0.5 percent humus). The herbicide is applied using a T-40 tractor-mounted OVT-1A sprayer. These machines are being converted. Booms with a 10-meter span, whch may be fabricated right in the farm workshops, are being mounted on these vehicles. Mounted every 30 centimeters along the booms are sprayers 1.25 millimeters in diameter. So as to prevent the spray tips from becoming clogged, the filters, tanks and booms have to be kept clean and regularly rinsed with water with industrial soda. As the herbicide is applied, the tractor moves along steadily in third gear only. The application is performed in the morning and in the evening in calm weather.

Manual weed-control operations are virtually impossible on large soy bean crop areas; such highly effective herbicides as, for example, treflan and zenkor therefore play a decisive role in weed-killing operations. The first is spray-applied using GAN [tractor-mounted herbicide-ammonia applicator] -8 and GAN-15 herbicide-ammonia applicators prior to presowing cultivation on the basis of 1-1.5 kilograms of active substance per hectare. This herbicide evaporates quickly, so it has to be worked into the soil immediately after surface application. Following the GAN-8 applicator unit for this purpose are then two tractors with cultivators or heavy disk harrows. On irrigated soils, herbicides kill 85-90 percent of the weeds.

The purity of the seed beans should be no lower than 95-98 percent, their germination rate 95-90 and the bean moisture content 14 percent. To insure the best formation of root nodules and a rapid development of the plants, the seed beans should be treated prior to planting with solutions of trace element salts (a mixture of 1 percent ammonium molydate and a 0.1 percent solution of cobalt sulfate) and on the day of sowing with the bacterial preparation nitragin dissolved in pure water.

We obtained a higher yield of beans and green bulk when we sowed the seed beans in soil heated to a temperature of 10-12 degrees. Under the conditions prevailing on the lower Syr-Dar'ya, this corresponds to the period [illegible] April in the south and 15 April-3 May in the northern part of the region. It should be kept in mind that with early sowings the seed molds, it is long in sprouting or it produces only a thin stand of sprouts. The beans were planted with inter-row spacings of 60 centimeters using SKON [combined mounted vegetable seeder] -4.2 and SON [mounted vegetable seeder] -4.2 vegetable seeders. The SPCh-6 precision seeder may also be used. The standard is 400-450,000 germinating seeds, or 85-90 kilograms, per hectare. The seed is planted and covered over to a depth of 4-6 centimeters.

We harrowed with light or medium harrows at right angles to the sowing prior to germination to insure the best germination rate and to kill weeds. We performed this operation after the soy beans had sprouted or had grown no more than a centimeter while weeds had already appeared at the surface of the soil. We harrowed after germination upon the appearance of the ternate leaves (perpendicular or diagonal to the sowing rows). Before the rows grew together we performed a total of 3-4 inter-row cultivation operations using a KRN [toolbar weeder and cultivator] -4.2.

The bacterial fertilizer nitragin should be employed extensively on swampy-grassland soils in the sierozem regions, in which the humus content is rather low. If the soy seed beans are not treated with it prior to sowing, the plants then have to be provided supplemental nutrients in the form of artificial nitrogen fertilizers. The first fertilization should be performed as soon as possible upon the appearance of the ternate leaves, the second prior to blossoming. Two quintals of ammonium nitrate and 1.5-2 quintals of superphosphate are applied per hectare with each application of fertilizer.

Obtaining high bean and green bulk yields requires optimum irrigation conditions. While prior to their blossoming stage, soy beans can indeed endure temporary soil moisture deficiencies (without noticeable wilting), upon reaching that stage they require plenty of moisture. This is connected with the special characteristics of the plants' growth and accumulation of overall mass. Under the conditions prevailing in southern Kazakhstan, the entire soy bean growing period may be divided into three phases. During the first phase, from sprouting to blossoming, when the rates of growth and accumulation of biomass and the productivity of photosynthesis are not high, the plants require only a small amount of moisture. The basic agricultural operations to be performed during this phase are inter-row cultivation, fertilization and irrigation with subsequent inter-row cultivation. The second phase lasts from the beginning of blossoming to the end of bean formation. It corresponds in time to the hottest part of the summer (July through the first half of August). This is the period in which there is intensive growth, accumulation of biomass and increased productivity of photosynthesis. Primary agricultural operations in this phase therefore consist of providing the plants with moisture and nutrients. Four-five waterings are required, with 12-14 days between waterings. The third phase is the period in which the beans mature (from the end of the bean formation process to full maturity). The soy beans' water requirement drops in this period, and one watering is sufficient.

In the rice-growing reigon of Kzyl-Ordinskaya and Chimkentskaya (Kzyl-Dumskiy region) oblasts, where the relative air humidity is low and summer temperatures reach 38-42 degrees, obtaining maximum soy bean and green bulk yields requires the maintenance of a soil mositure level of no lower than 70 percent of maximum field water capacity (PPV) during the first phase, 80 percent during the second and 70 percent during the third.

Soy beans cultivated on large check plots (2.5-4 hectares) within a rice field engineering system should be irrigated through the furrows so that the soil is well moistened. This must be followed by inter-row cultivation. Sprinkling is very beneficial. The Fregat and Volzhanka DDA [two-arm sprinkler unit] -100M systems should be employed for this purpose. This process gives the bean plant leaves a good washing; they absorb more solar radiation; it enhances the photosynthesizing process and it contributes to the production of high bean yields.

In the case of the cultivation of tall varieties of soy beans for silage, the green plants are harvested during the milky-waxy stage of maturity and then packed in trenches mixed with corn, sorghum and other crops.

The soy beans are harvested (wehn 90-95 percent of the beans have matured) employing the direct combining method using converted SK [self-propelled combine] -4 combines operated at reduced speeds. It is important not to miss beginning harvesting operations at the right time. They should then be completed within a short period of time--within 2-3 days. So as to reduce damage to the beans in the course of threshing operations, the rotation rate of the drum is reduced to 400-450 revolutions per minute by changing the positions of the pulleys. The decks are lowered. The beans are taken from the combine to a threshing area, where it is cleaned by OVP-20, OVA-1.0 and OS-4.5A grain-cleaning machines using the appropriately selected screens. As valuable feed, the straw and chaff should be gathered following the mowing and threshing and then baled and pressed.

Soy beans are a valuable and essential crop. We must therefore move more boldly in introducing its cultivation into the farming operations of our region.

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DEEP TILLAGE OF HEAVY SOILS URGED

Minsk SEL'SKOYE KHOZYAYSTVO BELORUSSII in Russian No 9, Sep 79 p 30

[Article by Sh. I. Brusilovskiy, director of the laboratory of reclamation for mineralized water-logged lands of BelNIIMiVKh [Belorussian Scientific Research Institute of Reclamation and Water Management], candidate of technical sciences: "The Deep Tillage of Heavy Soils"]

[Text] In the Belorussian SSR there are over 2.1 million hectares of mineralized soils that are periodically water-logged. In Vitebskaya Oblast alone there are over 500,000 such hectares. As a rule, such soils are characterized by a great discrepancy in potential and low actual fertility. In a number of the republic's rayons these kinds of soils occupy 20-50 percent and in some enterprises 100 percent of the total area.

On the surface these soils are represented by heavy loams with a bedding of clay strips at a depth of 30-50 centimeters. The content of physical clay fluctuates from 24 percent in the plowing layer to 72 percent in the sub-plowing layer. As a result of unfavorable water and physical conditions these soils are subject to water-logging even in years with average amounts of precipitation.

Until recently they were drained by means of clay drainage with a distance of 10 meters between drains and a depth of 0.8-1.0 meters. However, long-term experiments conducted by us in experimental-production sections of the Voskhod Kolkhoz and the Sharkovshchinskiy Sovkhoz of Vitebskaya Oblast showed that the complete deflection of surplus waters did not occur with drainage alone. Attempts to improve the water regiment of heavy soils by concentrating drainage also did not yield the expected results.

One of the most effective ways to improve the drying action of drainage on heavy soils is deep tillage using a three-post tiller. Its effectiveness has been studied by BelNIIMiVKh at the Sharkovshchinskiy Experimental-Production Section of Vitabskaya Oblast since 1969. In topography the plot is a plain whose soil-forming rocks are heavy and more rarely average loams and clays.

Experiments have shown that deep tillage decreases the volumetric mass and hardness of the soil. With this there is an increase in filtration properties and in the volume of the drainage current. Thus, during the initial period water permeability of the plowing layer increases by 2-4 times and of the sub-plowing layer at a depth of 50 centimeters--by 26 times. At the same time there is an improvement in such hydrophysical properties as the porosity and complete moisture capacity of the soil. All of this noticeably raises the drying action of clay drainage.

During the spring and fall periods the moisture content of the plowing layer is much lower on land where deep tillage has taken place than on land where it has not. On the other hand, during dry summer periods the moisture content of the sub-plowing layer of soil increases on plots where deep tillage occurs, which is very important for farming.

Deep tillage has a considerable effect on raising the productivity of all agricultural crops. For example, on land that is tilled deeply winter wheat yields 6-8 quintals per hectare, barley--4-5 quintals per hectare and potatoes--18 quintals per hectare more than on land that is not tilled. Here the distance between drains has no significant effect.

By improving the hydraulic-physical properties of compact soils, deep tillage has a positive effect on the development of the root system of the plant. In the first year after deep tillage occurs the amount of air-dried mass of barley roots in the plowing layer increases by 27.9 percent. In crops with deeply-penetrating root systems such as alfalfa for example, the increase in the plowing layer is 19.7 percent, and in the subplowing layer (20-40 centimeters)--24 percent.

Since 1974 we have been studying the effectiveness of deep tillage in conjunction with measures to organize surface currents (surface planning, selective layout of sown furrows and absorption wells). These experiments have shown that on undrained lands the yield of vetch-oats mixtures increases from 133 to 191 quintals per hectare, or by 43.6 percent; of winter wheat grain--from 23.7 to 28.4 quintals per hectare or by 19.8 percent. The same was true when drainage was spaced at 40-60 meters apart. Effectiveness is somewhat lower when the aforementioned complex is utilized with a distance between clay drainage of 20 meters although here too the increase in the yield of winter wheat comprised 8 quintals per hectare, a growth of 21 percent.

Taking into consideration the fact that the cost of the aforementioned complex of supplementary measures does not exceed 100 rubles per hectare and that the distance between drainage can be increased significantly, the economic effectiveness of the given measures is apparent. In doing this, there is a significant increase in the yield of agricultural crops because of the sparser spacing of drainage. The cost of deep tillage (up to 20 rubles per hectare) with a periodic renewal once every 3-4 years is justified on the basis of the increase in the yield of agricultural crops already during the first year.

on heavy soils the methods of tillage and tillage-mole draining are very effective. Thus, if the upper 60-centimeter soil layer is in good condition and the lower layers are ductile and mole-resistant, then it is expedient to first perform strip tillage-mole draining with clay drainage to a depth of 0.8-1.2 meters using RK-1.2 tillers. This should be followed by parallel continuous tillage or tillage-mole draining using the PL.65.2.5 tiller. With deep drainage (1.2 meters and more) this enables us to accelerate and ease the transformation of surplus gravitational waters to drains. In order to avoid damage to the drains during tillage-mole draining the deep tiller should be adjusted in such a manner that the mole drainage is located in the soil at a depth which retains a clearance of no less than 10 centimeters between the top of the material anu the bottom of the mole drains.

The coordination of continuous tillage with temporary mole-draining enables us to expand the amount of time during which these operations can be performed. These measures can be taken even when the lower soil horizons are not completely dry. The use of an RK-1.2 and a 20-centimeter drain enables us to use this equipment to drain lands of the meadow-swamp type ahead of time.

Deep tillage in conjunction with other agricultural reclamation measures is used extensively in the reclamation of heavy soils. For example, in the Put' Lenina Kolkhoz of Sharkovshchinskiy Rayon in 1976-1977 this method was used on an area of 183 hectares; in the Sovkhoz imeni Gagarin--on 344 hectares; and in the Mayak Kolkhoz--on 265 hectares. It yielded positive results everywhere. For the 1979 harvest heavy soils were tilled on an area of 927 hectares in seven enterprises of this rayon. Twelve enterprises conducted operations to carefully level the surface of fields using wide-based planers an an area exceeding 1,000 hectares.

The practical use of this agrotechnical method places new goals before the operational service of MIVVKh [expansion unknown]. In the near future it will be necessary for them to organize repeat deep tillage in order to maintain normal water-air regiments on land that has already been assimilated. To do this it is essential to acquire the required equipment in order to service kolkhozes and sovkhozes according to contracts.

Our experiments and an analysis of the literary data demonstrate that the main regime for the use of deep tillage and tillage-mole draining is clay and loamy sod-podzol and sod-carbonate soils with various degrees of gleying and with a filtration coefficient of less than 0.P. minutes per day in the subplowing layers of soil. These measures are effective on lighter mineral soils as well if they have an underlying water-containing stratum whose elimination results in a noteable improvement in the water regiment of the soil layer containing plant roots.

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PREPARING SOIL FOR WINTER WHEAT DISCUSSED

Alma-Ata SEL'SKOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 9, Sep 79 p 17

[Article by M. Zhanabekov, staff scientist for the Krasnovodopadskaya State Plant Breeding Station: "Preparing the Soil for Winter Wheat"]

[Text] A soil cultivation system under conditions of dry, nonirrigated agriculture must above all be oriented toward achieving maximum accumulation and preservation of moisture. The purpose of our research in this connection was to study the subsurface method of cultivation for winter wheat. We conducted it in a semidry, nonirrigated region on a permanent grain fallow-grass crop rotation station. The soil in the test area is the common heavy clayey loam chernozem with 1.4-1.5 percent humus content in the plow layer. The average annual amount of percipitation is 403 millimeters.

The results of our observations indicated that with subsurface cultivation, the specific soil weight decreased in comparison with moldboard plowing, especially at the beginning of the vegetative stage and in the top layer; with moldboard plowing the soil becomes buckshot soil and dries out more thoroughly. Final soil preparation operations require repeated cultivation using heavy implements (BDT [heavy-duty disk harrow] -2.2 with ring roller), consequently, the soil become tightly packed. Furthermore, crop and a great part of the root residues in fields cultivated by the subsurface method remain concentrated in the upper layers, which also contributes to slowing down the packing of the plow layer.

We also conducted observations of soil temperatures at depths of 5, 10, 15 and 20 centimeters. Throughout the spring and summer period, soil temperatures were higher in the moldboard-plowed field than in the field cultivated by the subsurface method. This is to be explained precisely by the fact that in the case of moldboard plowing, the soil become packed in the course of the growing season and heats up more quickly than the loose layer, which dries out the soil. There is consequently more moisture in the upper layers of the soil against a background of subsurface cultivation.

This is one of the reasons that winter wheat yields are higher with subsurface cultivation. The average increase after cultivation, and with respect to furrow slice inversion, was calculated as 1.4 quintals per hectare as compared with moldboard plowing. All of this permits us to conclude that under the dry, nonirrigated conditions of Chimkentskaya Oblast, the subsurface method of cultivating soil for winter wheat increases productivity and improves the physical properties and water and temperature conditions of the soil.

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INCREASING THE EFFECTIVENESS OF FERTILIZERS

Moscow SEL'SKOYE KHOZYAYSTVO ROSSII in Russian No 8, Aug 79 pp 13-14

[Article by A. Postnikov, chief of the Main Administration for Chemicalization of the RSFSR Ministry of Agriculture: "Increase the Effect of Fertilizer"]

[Text] One of the most important features of modern agriculture is the fact that from year to year a greater and greater portion of the output from crop production is obtained due to the wide application of mineral and organic fertilizers. For example, three fourths of the increase in the harvest in the nonchernozem zone is already attributable to fertilizers. In the zone there are many farms and entire regions where their skillful use permits 35-40 quintals of grain per hectare to be harvested. In a word, the volume of agrochemical work which is carried out is steadily growing, and, according to preliminary outlines, will reach 6.4 billion by 1990, that is, it will almost quadruple.

The State is investing enormous funds in the construction and rebuilding of enterprises which produce mineral fertilizers. It is also incurring a significant portion of the constantly increasing expenses of kilkhozes and sovkhozes for chemization. During the current five-year plan, more than 2 billion rubles will be spent in the Russian Federation in payment for liming and phosphate fertilization activities and the use of peat. The State subsidy to the farms to defray the difference in the prices of mineral fertilizers is more than 5 billion rubles. In other words, chemicalization has become a matter of great state importance. As is known, Russia's agriculture is the largest consumer of chemical resources. Now more than 330 million tons of organic fertilizers are used each year, including 8 million tons of nitrogen, 4 million of phosphorus and 5 million tons of nitrogen, 4 million of phosphorus and 5 million of potassium, that is, 47 percent of the nutritive substances contained in the mineral fertilizers delivered to agriculture in 1978. However, a large quantity of the nutritive substances is still being lost due to poor storage and imprope use of organic chemistry. Now, a program for improving the storage and use of organic fertilizers has been developed and approved by the RSFSR Council of Ministers for the period up to the year 1990. Capital investments will be set aside beginning in 1981 specially for the construction of manure storage facilities.

Given the proper organization of the matter, it is possible to bring the stockpiling of organic fertilizers on the farms in the nonchernozem zone alone up to 160-180 tons per year. For now only half as much is being delivered to the fields. Even now, an important reserve of organic chemistry storage such as the use of straw for cattle litter is poorly used on the kolkhozes and sovkhozes of the zone. Several organizations of Goskomsel'khoztekhnika [State Committee on the Agricultural Equipment Association] are frustrating plans for delivery of peat to agriculture. Its quality is not always up to standards, and even on the farms themselves, it is used inefficiently part of the time: a large portion of the peat goes for making composts, and only an insignificant part for litter, a fact which hinders the utilization of liquid manure.

It is extremely important to insure mechanization of the technological processes of storage, transportation and application of immense quantities of organic fertilizers more quickly. The agrochemical service and agricultural units must deal with determining the demands for chemicalization technology more skillfully, work out the yearly and future requisitions for it on time and improve its utilization.

Analysis shows that the growing volumes for using chemical resources and improving the technology for their use improve soil fertility. While determining the balance of nutritive substances, we succeeded in establishing that the content of nitrogen, phosphorus and potassium in the soils has increased in recent years. However, there is still a significant scarcity of these elements throughout the RSFSR on the whole.

The role of scientific approach and analysis has increased particularly in connection with this fact. Reliable information on the dynamics of the balance of nutritive substances permits us to predict the production of stably high harvests more successfully. Estimates throughout the nonchernozem zone show that to produce an output from plant growing at a level of 25 quintals/hectare (in grain units), it is required that the content of available phosphorus forms be increased to 12-15 mg/100 g of soil instead of the 7 mg available at the present time. It is possible to achieve this state under the condition that for the years 1981-1990 32-33 million tons of phosphorus be applied, significantly more than is now being applied.

The volume of chemical land improvement has grown somewhat in recent years, not enough, it is true, to reduce the soil acidity significantly. For now the tempi of liming are lagging significantly behind the volumes of fertilizer being used. It is all a matter of the short supply of lime materials. Last year, agriculture in the republic was 8 million tons short of them. Questions concerning the provision of lime materials require the most constant attention because few amounts of them are being used as was formerly the case. These amounts are entirely inadequate for shifting the acidity to the prescribed value. Thus, for the years 1971-1977, 109.8 million tons of lime are estimated to have been applied to the total area of acid soils in the Russian Federation, and it should have been three times more.

Two hundred and fifty-four enterprises and open pit mines belonging to 24 ministries and departments are engaged in the production of lime materials for agriculture in the RSFSR. This output is not the primary mission for even one of them. The cost of lime fertilizers is only 1.5 percent of the total volume of sales, even for the largest supplier, the RSFSR Ministry of Construction Materials.

This position may be changed radically if the departmental isolation is eliminated and the service for a customer for lime material output is concentrated in a single organization. Being responsible for all of the operations for increasing soil fertility on a republic scale, it should take upon itself the resolution of the questions of financing, planning, guaranteeing material resources and contracts for construction operations. When this order is established, more possibilities for solving long-range problems such as carrying out liming in the most optimum time periods will also turn up.

The winter period should not be taken into account from the point of view of the selection of liming periods. There is one problem: to reach that power-worker ratio and organization of operations which would insure application of the lime before autumn or spring plowing, before replowing the fall-plowed field, in the fallow field and on drainage plots in the summertime or fall.

The common practice of individual agricultural organizations which release resources intended for chemicalization objectives for other needs inflict irreparable damage to the total cause. For example, the capital investments in the Ivanovskaya Oblast for the development of plant growing the chemicalization have been reduced by 9 million rubles this year, and cut back by 6.7 million rubles in the Kaluzhskaya Oblast. The position of the production administration of agriculture of the Tula oblispolkom particularly perplexes us. Only 10 percent of the three-year assignment for construction of mineral fertilizer warehouses in the oblast has been carried out. The chief of the administration N. Sevryugin and his assistant N. Chudakov have twice been sharply criticized at the board of the RSFSR Ministry of Agriculture for the chronic lag of this construction, and each time they affirm that they will correct the position immediately. And the result? The structure of capital investments for this year which were allocated to the Tula kolkhozes and sovkhozes has been corrected so that the plan for putting the mineral fertilizer warehouses into operation has been "curtailed" to almost one-eleventh of its former level. As they say, no comment is necessary.

The light-weight structures which have proved themselves so well in Kirovskaya, Moskovskaya, Permkaya and other oblasts are also being underused at present in the practice of creating a production base for chemicalization. We are speaking about the laminated wooden structures which successfully are replacing expensive metal, reinforced concrete and brick. They resist a severe environment and have a longer service life. It is simpler and quicker to build using them. The RSFSR Ministry of Agriculture could be of great assistance in the broad propagation of such structures. However, as the industrial workers see it, its interest in this question has not as yet been felt.

Unfortunately, complex liquid fertilizers (CLF) which exceed the solid mixtures in their economic performance have not found proper application either. It is enough to say that the costs for their storage, transportation and application into the soil are less by two-thirds, but there are many difficulties in mastering the new form of fertilizers. The production of special machinery and facilities for preparing the liquid mixes are slowly being mastered. In fact the prototype designs for CLF warehouses have not yet been worked out. Under the conditions which have arisen, it is necessary that the farms be ready to use local resources. Experience shows that it is possible to apply DLFs using machinery designed for use with ammonia water, toxic chemicals and liquid organic fertilizers. Tractor-type liquid manure spreaders, ATs-2, 2GAZ-91 and other kinds of tank trucks are good for transporting them.

Practice attests to the fact that a high efficiency of chemicalization is being achieved in places where old methods of carrying out agrochemical operations are decisively rejected and they have embarked on the path to the creation of specialized subdivisions. The process of radical rebuilding of the entire system of agrochemical service to kilkhozes and sovkhozes is continuing in the krays, oblasts and autonomous republics of the Russian Federation. Agrochemical complexes and chemicalization points are being set up on the large farms, and agrochemical centers are being established within the regions; specialized agrochemical scientific-production associations are already in operation in 33 oblasts, krays and autonomous republics. The advantages of the new form for agrochemical service are particularly apparent from the examples of the scientific-production associations, the first of which were created in the Moskovskaya Oblast and the Mariyskaya ASSR. For example, in the Maragrokhimob'yedineniye, the volume of work on chemicalization for the five-year plan increased by a factor of more than 5. Losses of fertilizer have been reduced by 20-25 percent with the reduction of internal handling and the creation of warehousing services. Intensification of agricultural production according to plan and the improvement in the administration of chemicalization have permitted us to raise the average yield of cereal grains in the republic by 6.2 quintals per hectare for the three years of the 10th Five-Year Plan, as compared with the Ninth.

Thus, having concentrated the entire material base into a single organization for which chemicalization will be the main and not a secondary matter, it is possible to rely on the successful resolution of all problems on which the increase in the efficiency of the use of chemical resources in agriculture is dependent. Of course, this implies the active assistance of all interested organizations and departments. In such an important matter, the pledge of success is seen to lie therein.

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USE OF FERTILIZER IN CROP ROTATION SYSTEM VIEWED

Moscow SEL'SKOYE KHOZYAYSTVO ROSSII in Russian No 8, Aug 79 pp 32-35

[Article by V. Ruskov, head of the Department of Agrochemistry, NIISKh [Scientific Research Institute of Agriculture] for the Central Regions of the Nonchernozem Zone, candidate of agricultural sciences: "The Fertilizer System in Crop Rotations"]

[Text] The fundamental task of the creation and incorporation of a scientifically based system for the use of fertilizers in crop rotation is the achievement of a maximumly high and stable harvest, obtaining output of food crops with high food values and fodder crops with feed value, simultaneously insuring the most efficient use of each unit of the fertilizers' nutritive substances and increasing soil fertility.

It is possible to solve this problem by the proper selection of the composition of fertilizers which are being applied, taking into consideration the peculiarities of their forms, the optimum quantities, periods and methods for applying the fertilizers to soil which has already been limed. Further, no fertilizer system will yield the desired results without observing crop cultivation procedures.

Liming, which eliminates soil properties unfavorable for plant development and increases the efficiency and the recovery of expenses for the fertilizers being applied, is a fundamental element of any system.

A multi-year stationary experiment conducted by the Scientific Research Institute of Agriculture of the Central Regions of the Nonchernozem Zone on soddy podzolic sandy loam developed on deep sand shows that without liming, the yield of winter wheat is extremely low and that the application of fertilizers in any combination does not result in any significant increase to the yield at all. The return of investment in grain for a kilogram of the active substance in fertilizers is 0.3-1. Application of phosphorous-potassium fertilizers does not apply any increment at all, while the organic fertilizers are ineffective: the increase in the harvest per ton of compost was 3.6 kg of grain.

The use of lime in quantities insuring neutralization of soil acidity sharply increases the total yield of winter wheat and the efficiency of the fertilizers which are applied (Table 1).

We will emphasize that the high efficiency of liming is primarily achieved by using adequate quantities of lime which were calculated for total neutralization of soil acidity of the entire layer of topsoil.

Table 1

Fertilizer	Yield quintal/hectare		Increment from liming	Grain produced per kg of fertilizer*, kg	
	on unlimed soil	on limed soil		on unlimed soil	on limed soil
NP	9.3	25.3	16.0	0.3	2.0
PK	8.6	23.4	14.8	not recovered	1.6
NK	10.4	28.1	17.7	1.0	3.0
NPK	9.8	28.7	18.9	0.8	2.2
compost	10.0	29.6	19.6	3.6	28.2
without fertilizer	8.9	18.3	9.4	--	--

*The return of investment with compost was calculated in kilograms of grain per ton of fertilizer.

According to the data from several researchers, the use of lime with potatoes, flax and lupine, particularly in increased quantities, sometimes reduced the harvest and the quality of the production of these crops. Therefore it was recommended that small quantities of lime be applied to them. However, the insufficient harvest of the basic crops in the crop rotation is too significant at such dose rates. The efficiency of the mineral fertilizers declines and the reaction of the soil mix remains acidic as before.

The results which have been obtained in recent years from experiments which have been carried out on experimental stations in Smolenskaya, Kalininskaya, Permskaya oblasts, at Moscow State University, at the Institute of the Potato Industry and the Scientific Research Institute of Agriculture for the Central Regions of the nonchernozem zone show that the negative effect of lime on these crops is sharply exaggerated. It may be just that in very poor, sandy soils when small quantities of potassium are applied and there is little available magnesium and boron in the soil.

The efficiency of liming depends on establishing scientifically based norms for applying lime and, to no less extent, on the correct selection of the neutralizing agent itself as a function of the set of crops in the crop rotation and the mechanical composition of the soil. In loams, the form of the lime material influences the productivity of the crop rotation and the overall level of the yield of agricultural crops insignificantly. However, when cultivating legume crops, fodder root crops, potatoes and perennial leguminous grasses in such soils, liming with neutralizing agents containing magnesium produce a great effect.

It is particularly important to select the form of the neutralizing materials properly for use on soils with a light mechanical composition (sandy, sandy loam and slightly loamy) which contain an insignificant quantity of magnesium in the top and subsoil layers. The supply of the basic elements for nutrition into the vegetating plants is sharply curtailed when this element is in short supply, and the efficiency of fertilizers falls off. Therefore, light soils should be limed with dolomite and magnesia limestone powder, schist ash or finely ground metalurgical slags. The use of ordinary limestone powder on such soils requires a compulsory application of mineral fertilizers containing magnesium--(sulfomag, a potassium-magnesium concentrate (kalimag), a potassium-magnesium sulfate fertilizer, sylvinite, kainite or cement dust).

It is no less important to determine the place for applying lime properly. In field and fodder crop rotation with grasses, it is good practice to apply the entire amount to the cover crop for the grasses. In crop rotations with flax, if the previous crops are not grasses, it is good practice to apply the lime close to the time this crop is sown.

In crop rotations with potatoes, it is necessary to lime in the spring before they are planted. In specialized crop rotations where the (potatoes) occupy 30-40 percent of the crops, the amounts of lime are reduced, whereas it is not advisable to lime mildly acidic sandy loam soils (pH greater than 5.5).

It has been proven by research that the highest productivity of a crop rotation and growth in soil fertility is achieved under the condition that, after previous liming, the crops receive a complete mineral fertilizer together with manure or composts. For example, in our stationary experiments in sandy loam soil with a high available phosphorous content, the greatest, and approximately equal yields in feed units (271-283 quintals per hectare] and protein (31-34 quintals) with a basic output for one cycle on the whole were obtained in those crop rotations where nitrogen-potassium fertilizers, a complete mineral fertilizer, compost alone and compost together with a complete mineral fertilizer were used. The amount by which the yield of feed units per hectare in these crop rotations exceeded the productivity of a crop rotation in which lime alone was provided was 70-82 quintals, and there was from 10-12 quintals more of protein. However, given an adequately high productivity of the crop rotation with the application of nitrogen-potassium fertilizers alone, the phosphorous content of the soil was reduced significantly, the quantity of humus and metabolic bases in the complex being absorbed did not increase, and its capacity did not increase in comparison with the soil of a crop rotation where lime alone was used.

The application of a complete mineral fertilizer resulted in an increase in the available phosphorous and metabolic potassium content in the soil and it stabilized the humus content at the level of limed soil, but it destroyed the absorbing complex and it reduced the content of metabolic bases in it. The use of organic fertilizers alone in a crop rotation raised the content of the basic elements for plant nutrition and of humus in the soil, and it significantly increased the content of metabolic bases in the absorbing complex; however, it did not insure maximum productivity of the crop rotation.

The productivity of crop rotations in which only nitrogen-phosphorous or phosphorous-potassium fertilizers were applied was still less. The yield of feed units in this case, as compared with the crop rotation in which lime was used but no fertilizers were applied, increased only by 30-35 (units) and protein increased by 2-6 quintals per hectare, the humus content did not increase, the absorbing complex was not improved. On the other hand, the systematic application of nitrogen-phosphorous fertilizers alone resulted in impoverishment of the soil, a lack in metabolic calcium, and to a sharp decline in the efficiency of nitrogen fertilizers.

Thus the combination of organic fertilizers with a complete mineral fertilizer which insures the maximum productivity of the crop rotation and an intensive increase in soil fertility is one of the most important principles of a proper fertilizer system. However this in no way means that it is necessary to apply organic fertilizers to all of the crops of a crop rotation together with the mineral fertilizers.

The principles for using organic fertilizers have also changed with the increase in the delivery of fertilizers to the nonchernozem zone. If organic fertilizers were formerly considered to be a basic source of mineral nutriments for plants and if it had been recommended that they be applied as frequently as possible in crop rotation, particularly in soils with light mechanical composition, now manure and composts are seen primarily as the basic source of organic substances for replenishing and increasing the humus reserves in the topsoil layer, although on many farms in the zone, up to 40-50 percent of the nutritive substances used by plants to form the harvest are applied to the soil using these fertilizers. It has been experimentally established that applying 7-10 and more quintals of mineral fertilizers (in standard fertilizer form) to a hectare of crop rotation area permits us to apply manure and compost 1-2 times per cycle without reducing the productivity of the crop rotation or the level of soil fertility.

In the Institute's experiments which were conducted in a 6-field crop rotation, the identical yields of feed units and digestible protein were provided without making the agrochemical properties of the soil worse, both during single and twofold as well as during 3-5-fold application of compost per cycle of the crop rotation (Table 2).

As we see, with the 3- and 5-fold application of compost in small quantities as compared with the single and twofold application of the same quantity, the labor costs grew and the production cost of a quintal of feed units increased. The experience of the foremost farms in the Moscow Oblast, where manure and compost are applied in large quantities either to row crops or to row and winter cereal crops confirm the advisability of single and twofold application of organic fertilizers during the cycle.

Table 2

Compost use variant	Yield per crop rotation cycle, quintal/hectare		Costs			
	feed units	digestable protein	of labor per hectare sown, man-hr	of labor per quintal of feed units, man-hr	capital for organic fertilizers and their application, R	production cost of a quintal of feed units, R
50 T/hectare at start of crop rotatio	201	13.7	308	1.53	135	6.64
25 T/hectare twice during cycle	201	13.8	312	1.55	153	6.76
16-17 T/hectare 3 times during cycle	196	13.3	319	1.63	170	7.0
10 T/hectare 5 times during cycle	197	13.4	367	1.87	208	7.15

*The average annual amount of NPK was 11 quintals of standard fertilizers per hectare.

Cultivation of annual lupine in fallow fields permits us to enrich the soil with an organic material and increase its fertility. Presently dual use of this crop is practiced: The grain and the above-ground mass for fodder and the root and stubble residue for fertilizer. Annual fodder lupine, even in poor sandy and sandy loam soil, given the proper agricultural technology, yields 200-250 quintals of green mass per hectare on the average, and on soils of average fertility, the yield is 300-400 and more quintals, leaving 80-160 quintals of root and stubble residue for tillage.

Table 3

Fallow-field crop	Yield of basic output, quintal/hectare		Productivity of a member of the crop rotation (less the seeds spent on sowing)				
	fallow-field crop	grain from winter wheat	grain, quintal/hectare	feed units, quintal/hectare	protein, kg/hectare		
					in fallow field	with winter wheat	*
Nemchinovskiy 846 lupine for grain	18.9	36.8	30.7	60.2	675	396	972
Fast-growing lupine 4 for silage	275	39.0	33.5	73.7	653	412	1065
Green (manure) lupine	196	36.8	31.3	40.6	--	396	396
Vetch-oat mix for green mass	150	35.8	30.3	60.7	227	384	611
Early potatoes	114	37.1	34.1	63.0	118	399	517
Clear fallow	--	37.3	34.3	41.2	--	401	401

*Total for crop rotation member

In recent years, the fast-ripening variety of narrow-leafed fodder lupine, Nemchinovskiy 846, suitable for cultivation in fallow fields for grain, a variety developed by our Institute, has been regionalized in many oblasts and autonomous republics. Comparative testing of it and other fallow-field crops on the light soils of the Moscow Oblast showed that Menchinovskiy 846 leaves more than 60 quintals of air-dry mass for fertilizer in the form of stalks, leaves and pod glumes, together with the root residue. This mass contains no less than 44 kilograms of nitrogen, 27 of phosphorus, 67 of potassium and 97 of calcium oxide per hectare. Furthermore, as is seen from Table 3, cultivation of Nemchinovskiy 846 makes it possible to increase the yield of grain by 16-20 quintals in the crop rotation member fallow field-winter wheat as compared with other forms of fallow fields and to produce the same grain harvest from winter wheat as is the case when it is put out

Table .

Fallow-Field Crop	cost of the output obtained from the crop rotation member fallow-winter wheat, rubles	capital expenditures for cultivating the output of the member (less the seed cost), rubles	Labor costs for production of 1 quintal of output, man-hr			cost, rubles			
						1 quintal of output			
			in fallow fields (grain, green mass, tubers)	for winter wheat	for 1 quintal of feed units	in fallow fields (grain, green mass, tubers)	winter wheat grain	1 quintal of feed units	recovery of invested assets
Nemchinovskiy 846 lupine for grain	1226	256	1.48	0.76	0.85	13.96	3.56	4.34	4.78
Fast-growing lupine 4 for green mass	731	274	0.09	0.72	0.66	1.10	3.52	3.76	2.67
Green (manure) lupine	354	405	--	1.36	1.13	--	11.25	6.68	not recovered
Vetch-oats mix for green mass	611	211	0.14	0.77	0.71	1.23	3.60	3.43	2.89
Early potatoes	1423	345	0.80	0.66	1.48	5.46	3.22	5.53	4.13
Clear fallow	393	221	--	1.34	1.12	--	3.62	5.43	1.78

over vetch-oats, clear or potato fallows. This member of the crop rotation is equal to the member with fodder lupine for green mass, based on the total protein yield, and it exceeds all of the other members which were tested by a factor of 1.5-2.5.

A calculation of the economic effectiveness (Table 4) showed that when cultivating this variety of lupine in fallow fields, the same amount of output in feed units may be produced as when cultivating early potatoes and the vetch-oat mixture, and, in terms of cost, almost as much as when cultivating early potatoes.

Some words now on green (manure) lupine. As may be seen from Tables 3 and 4, it does not make it possible to achieve higher productivity of the tilth in the fallow-field crops in comparison with the cultivation of all other fallow-field crops, and it increases the production cost of winter wheat grain. Expenses for its production are not recovered. Therefore, this type of lupine should be cultivated only in very poor soils, in their initial period of cultivation and in places where it is impossible to produce satisfactory harvests of other crops.

While distributing the fertilizer within the crop rotations, one must carefully take into consideration the soil peculiarities of each field, the type and the form as well as the scientifically based recommendations for periods and means for application, as well as the depth of application. For example, light soils require more fertilizers than do heavy ones. In highly fertile soils with increased available phosphorous and metabolic potassium content, the quantities of phosphorous-potassium fertilizers may be equal to the loss of their nutritive elements with the harvest; conversely, with low phosphorous and potassium content, the quantities of fertilizers should exceed their loss with the harvest significantly, and thereby insure accumulation of reserves of the nutritive elements. In highly fertile soils which have been intensely fertilized with nitrogen-phosphorous fertilizers and in those which have recently been limed, the role of potassium fertilizers grows, and quantities of the fertilizers should be increased.

In a system for using fertilizers in a crop rotation, one may not neglect the qualitative features of the various forms and kinds of fertilizers. Thus, granulated forms of super phosphate should be applied directly during sowing of winter and summer crops, legumes and perennial grasses and corn. It is advised that powdered super phosphate be used as the basic fertilizer in well-limed soil, whereas in slightly limed soils, it is better to use granulated super phosphate as the basic fertilizer so as to reduce the conversion of available phosphorous forms of the mineral fertilizers into forms which are not available and which are inaccessible to the plants. Conversely, phosphorous powder produces a greater effect when it is applied to unlimed, acidic soil.

Potassium fertilizers are also used in different ways. For example, it is best to use potassium chloride early on potatoes and corn in order to create conditions for the chlorine to be washed away from the root zone of the soil. It is advisable to apply a 40-percent potassium salt and raw potassium salts in the fall on the autumn tillage and, most importantly, on fodder beets and turnips. This practice will insure that excess chlorine is washed from the soil and that sodium is supplied to the root crops, which consume almost as much of it as they do of potassium.

Potassium fertilizers containing a significant quantity of magnesium should be applied to all crops in the crop rotation in light soils and to the crops which remove much magnesium with the harvest (potatoes, corn, legumes, lupine, clover and alfalfa) in sandy loams.

In all cases, it is necessary to apply the basic part of the norm for phosphorous-potassium fertilizers to fall tillage so that the fertilizer is distributed throughout the whole thickness of the topsoil layer.

It is advisable to apply the entire amount of phosphorous-potassium fertilizers (excluding the part of the phosphorous locally applied) calculated to produce a harvest from a fallow-field or cover crop, as well as from winter crops and grasses completely on the autumn plowed fields in the fall, preceeding planting of the fallow-field or cover crop for the members of the following crop rotation: Fallow-field crop--winter crop and cover crop--perennial grasses.

The use of nitrogen fertilizers requires particular attention. One must bear in mind that the nitrogen from all forms of nitrogen fertilizers converts into nitrate after being applied to the soil. This nitrate is easily washed away from the root zone. In order to avert the loss of this element, the quantities of nitrogen fertilizers should conform strictly to the consumption of the plants and to producing the harvest which has been planned. Excessive nitrogen, as a rule, results in lodging of cereal grain crops, protraction of their ripening periods, unjustified losses of this element due to its incomplete use by the plants and pollution of the environment.

The various forms of the nitrogen fertilizers delivered to agriculture dictate varied means and times for their use. Ammonium nitrate may be used on all crops as a basic fertilizer and as top dressing. Urea is suitable for use both as a basic fertilizer on all crops and for liquid leaf-feeding top dressing. Winter crops may also be dressed with it if ammonium nitrate is not available. But in this case harrowing, which will prevent a loss of the ammonia due to rapid evaporation, is mandatory. These losses may reach 50-60 percent.

Ammonium sulfate is physiologically an acidic fertilizer containing nitrogen in an ammonia form. These peculiarities determine the possibilities for applying it as a basic fertilizer, being applied into the soil in the fall during the autumn plowing. This fertilizer is good for top dressing only in well-limed soils or given neutralization of the ammonium sulfate's acidity with lime or chalk. It is also advisable to use it in soils with inadequate sulfur content.

Liquid nitrogen fertilizers, in which the nitrogen is in an ammonia form, are only used when worked into the soil during plowing and cultivation, as well as when dressing the tilled crops.

Complex fertilizers containing two or three nutritive elements are used primarily for local application on cereal grains and tilled crops, as well as for the basic fertilizer on all crops and as top dressing for winter cereal grains which were sown without fertilizers being applied in the fall.

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PROMISING FODDER VARIETIES IN TADZHIKSTAN

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/Article by V. S. Parishkura, honored scientist and honored agronomist of the Tadzhik SSR: "Promising Fodder, Postharvest and Intermediate Crops and Varieties for the Cotton Complex"/

/Text/ Year-round use of irrigated lands is very important for further improvement of irrigation farming and for intensified cotton raising.

The first half of April is the best time for sowing cotton in the Vakhshskiy Valley. Total daily temperatures from January to this period have averaged [illegible] in several years. Therefore the cotton complex should include quick-growing and early ripening crops and varieties that will provide a yield of green fodder at average daily temperatures totaling 350-550° over this period and will leave the field fallow for 5-10-15 days before cotton sowing begins, not interfering with timely and proper preparation of the soil for sowing the main crops at the best times.

After many years' study, the Division of Agricultural Engineering and Crop Rotation of the Vakhshskiy Branch of the TNIIZ /Tadzhik Scientific Research Institute of Agriculture/ has developed a number of promising fodder, fodder-green manure, postharvest and intermediate crops and varieties for the cotton complex.

Among the fodder crops, the new varieties of sorghum are highly important:

Multiple-yield sorghum: Two varieties of annual multiple-yield sorghum have been developed, namely the ultra-early ripening Vakhshskoye-19 (19-V) and the early ripening Vakhshskoye-10 (10-V). The former is second in early ripening (in 3-4 days) only to Krasnodarskaya-1967 Sudan grass. The height of its herbage reaches 240-270 cm. In four cuttings it yields 1,800-2,200 quintals per hectare of green mass and 400-500 quintals per hectare of hay. The period from sowing (20-30 March) to the first cutting, when the panicles begin to sprout, is 50-55 days, that between the first and second cutting is [illegible]-38 days, that between the second and third cuttings is 38-42 days, and that between the third and fourth cuttings is 50-56 days. The last cutting is 1-15 October.

The 19-V sorghum yield requires average daily temperatures totaling 1,200-1,310° in the period between sowing and full formation of the ears in the first cutting, 980-1,100° in the second cutting, 1,050-1,100° in the third cutting, and 1,130-1,250° in the fourth cutting.

Sorghum 10-V ripens 4-5 days later than the 19-V variety. The height of its herbage reaches 260-300 cm, and after the fourth cutting it yields 1,900-2,400 quintals of green mass per hectare and 450-550 quintals of hay.

Sorghum 19-V is recommended for combined sowings with alfalfa for hay and green mass, and sorghum 10-V for sowing in cornfields for hay, haylage and ensilage.

These varieties of sorghum are being bred and introduced in the kolkhozes and sovkhozes of Vakhshskiy valley and in other cotton planting areas. A number of promising postharvest and intermediate crops and varieties of the legume, mustard and grass families have been developed.

The legume family: promising varieties of clover, namely ultra-early ripening 4-V, early ripening 3-V and 5-V, and early ripening, quick-growing 8-V as well as medium ripening 7-V; the early ripening, cold-resistant 1-V variety of berseem and a promising variety of Turkmenian vetch.

With fall sowing at the best time in the southern regions (1-15 September), by the end of March clover produces a cumulative yield of 300-450 quintals of green mass per hectare, 60 quintals of postharvest remnants per hectare, [illegible] quintals of dry root fodder per hectare, and 180-200 kg of organic nitrogen per hectare. Clover grows well after any predecessors and on any soils except swamped and gypsiferous ones, and with the right agricultural methods it can be raised even on medium and highly saline lands.

Plowing in 300-450 quintals of green clover per hectare increases the cotton yield, in relation to the type of soil and the technology of the green mass crops and the cotton plant, by 8.7 quintals per hectare in the first year and by 7.0 quintals per hectare in the second year.

Vakhshskiy-1 (1-V) berseem resists 25° frosts. With fall sowing at the best time (1-15 September) in the southern regions, by 1-5 June it yields up to [illegible]-300 quintals per hectare of green mass, 80-100 quintals per hectare of postharvest remnants, and 80 quintals per hectare of dry root fodder, and it accumulates 180-200 kg of organic nitrogen per hectare. The yield of berseem seed is 10-12 quintals per hectare. Under our conditions it is not attacked by any pests or diseases.

Like clover berseem is one of the best predecessors for cotton plants. Plowing in green berseem raises the yield of raw material by 4-12 centners per hectare and more.

Turkmenian winter vetch is a cold-resistant crop, tolerant of salt and soil variations. It is promising for summer postharvest sowings.

Pulse and grain mixtures (vetches with early ripening varieties of 116-V rye and 110-V oats) sown in the southern regions from 10 to 25-30 August produce accumulations of as much as 350-500 quintals of green mass per hectare in 50-60 days, which can be used for hay, haylage, ensilage and green mass from 20 to 30 October until the snow falls.

The Cruciferae family: ultra-early ripening Vakhshskaya-26 (26-V) colza and ultra-early ripening Vakhshskiy-15 (15-V) rape. In addition, a spring Regina rape, a winter Esterhazy rape and a mustard were also developed.

With fall sowing at the best time (1-15 October) and average daily temperatures totaling 300-380° from 1 January to the start of blossoming, 26-V colza and 15-V rape accumulate up to 300-450 quintals of green mass per hectare for plowing in to fertilize the cotton plants.* This increases the cotton yield by 4-6 quintals per hectare.

At average daily temperatures from 1 January totaling 450-550°, spring Regina rape accumulates 460-500 quintals of green substance per hectare by 20-25 March. At average daily temperatures totaling 550-600°, Esterhazy rape accumulates 450-600 quintals of green mass per hectare by 20-25 March.

Regina and Esterhazy rape are recommended for sowing in combination with grain crops (116-V rye, 34-V barley) on growing cotton plants (1-15 October) or after mechanical harvesting of the cotton (10-25 October) they are used for cattle feed, with subsequent plowing in of the postharvest remnants.

Early ripening-351 mustard is a first-class postharvest crop. In 50-60 days after sowing (1-30 August) it accumulates up to 400-650 quintals of green mass per hectare which, when plowed into a winter fallow, increases the cotton yield on mellow lands by as much as 12-18 quintals per hectare.

The grass family: ultra-early ripening Vakhshskaya-116 (116-V) and 18-V, early ripening 152-V, medium early ripening 158-V, and medium late ripening [illegible]2-V summer rye, ultra-early ripening Vakhshskiy-34 (34-V) barley, postharvest Vakhshskiy-110 (110-V) oats and intermediate Vakhshskiy-109 (109-V) oats.

The most general fodder-green manure crop is 116-V rye. It can be used for postharvest and intermediate sowings in various crop rotation fields. In the case of summer sowings (10-30 August) it produces the first yield of green mass (350-400 quintals per hectare) after 50-60 days. After mowing, top dressing and watering it grows well and produces the second yield of green mass (350-400 quintals per hectare) by 1-5 April. It is recommended for fall sowings on alfalfa of previous years, for summer postharvest sowings on cornfields and for intermediate sowings on growing cotton plants (1-15 October) or after mechanical harvesting of the cotton (15-25 October).

With fall sowing at the best time (20 September-10 October) and at average daily temperatures totaling 400-450°, the ultra-early ripening variety of

*By 5-15 March.

Vakhshskiy-34 (34-V) barley enters the stage of mass ear formation and yields up to 300-400 quintals of green mass per hectare by 15-25 March. It is recommeded for additional fall sowing (1-20 October) on alfalfa of previous years and intermediate sowings on growing cotton plants (20 September-10 October) and after mechanical harvesting of the cotton (15-25 October).

Postharvest 110-V oats are an early ripening and highly promising postharvest crop. With summer sowing at the best time (10-25 August) they sprout panicles after 50-60 days and yield up to 350-550 quintals of green mass per hectare when the herbage is 100-120 cm high. They are recommended for summer postharvest sowings along with vetch (in cornfields) and are used for hay, ensilage, haylage and green fodder from 20-30 October until the snow falls.

Intermediate 109-V oats are the earliest ripening (15-25 days earlier than Markton standard) variety in the case of intermediate sowings. They are a broad-leaved, thick-stalked, erect variety, more cold-resistant and 35-50 percent more productive than the standard. They are recommended mainly for additional late fall sowings on alfalfa of previous years (1-20 October), where they yield up to 500-600 quintals of green mass per hectare by 1-5 April.

All the above-mentioned varieties of grain crops are being tested in the State Crop-Testing Network and have been bred on the kolkhozes and sovkhozes of Vakhshskiy valley since 1978-1979.

The new intermediate crop perko, a hybrid of winter rape and Chinese cabbage, was imported from Bulgaria into the republic in the summer of 1978. It ripens 4-6 days earlier than spring Regina rape. Upon fall sowing (1-15 October) it produces the same yield of green substance as rape, namely 350-550 quintals per hectare. It has a very succulent green mass with an output of dry substance in the stage of initial mass blossoming of 11 percent.

According to the Bulgarian scientists' data, perko has the following composition:

	In green substance %	In dry substance %
Water	89.0	31.1
Raw protein	2.3	21.1
Digestible albumen	2.0	18.4
Raw fat	0.3	2.8
Raw fibers	1.1	9.7

Perko has more leaves than rape, and its green mass is readily eaten by all livestock species. Consequently it is a promising intermediate crop for use as a fodder in early fall and for plowing in as a green fertilizer.

The new ultra-early ripening and early ripening crops and varieties, in combination with the main crops, ensure year-round use of the lands in all cotton crop rotation fields, permitting use of 10-12 field intensified crop rotations by the 2:4:1:3 and 2:6:1:3 system (alfalfa--cotton--annual fodder field--cotton) or of short crop rotations by the 1:2:1:2:1:3 and 1:3:1:3:1:3 system, with alternation of the crops in crop rotation units (1:2 or 1:3) by the annual fodder field--cotton system.

On an annual fodder field it is expected to make year-round use of the lands with three to four yields, the first two or three of them for fodder and the last for green fertilizer.

The intensified and short crop rotations, as contrasted with the existing production crop rotations, provide for an increase in the overall fodder harvests by 3-4 times and rapid improvement of soil fertility and the cotton yield (in 2-3 years instead of 10-12 years), have a beneficial effect upon saline soils, and are an effective means of combatting cotton wilt.

Year-round use of the lands in all cotton crop rotation fields is possible for 35-50 percent of the arable land. Its introduction into production will have a great effect upon the agricultural economy and the national economy.

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PROBLEMS IN DEVELOPMENT OF FODDER PRODUCTION IN KAZAKHSTAN

Moscow VESTNIK SEL'SKOKHOZYAYSTVENNOY NAUKI in Russian No 9, Sep 79 pp 34-39

/Article by Academician Vaskhnil Yu. D. Zykov/

/Text/ Kazakhstan is the nation's main stock raising center in the east. Its fodder reserve is formed as follows: Animal husbandry obtains 65 percent of its fodders from natural fodder resources, 25-30 percent from field fodder production, and 5-10 percent from mixed feeds, wastes from the food industry and other sources.

The republic has a huge area of natural fodder resources (pastures and hayfields) covering 187 million hectares, or 69 percent of its land reserve. The pastures occupy 179 million hectares, and the hayfields only 8.2 million hectares. (8) As a rule the productivity of the natural fodder resources is low, that of the pastures amounting to 1.5-2.5 centners of edible air-dried substance per hectare, with low nutritive value, and that of the hayfields is only 7-8 centners per hectare, containing no more than 60 percent edible substance. Consequently the hay requirement is actually met solely within the limits of the reserves for wintering cattle.

The natural pastures and hayfields are unevenly distributed over the territory of the republic, which can be divided into three areas on this basis. The first one includes the oblasts with pastures and hayfields comprising less than 50 percent of their whole agricultural areas (Kokchetavskaya Oblast with 45.5 percent and Severo-Kazakhstanskaya Oblast with 33.4 percent), the second one those with 50-75 percent (Tselinogradskaya Oblast with 63.4 percent, Kustanayskaya Oblast with 65.5 percent, Pavlodarskaya Oblast with 63.3 percent, and Turgayskaya Oblast with 64.3 percent), and the third one those with 75 percent and more, including all the other oblasts of the republic (Alma-Atinskaya Oblast with 92.5 percent, Aktyubinskaya Oblast with 89.4 percent, Vostochno-Kazakhstanskaya Oblast with 85.6 percent, Gur'yevskaya Oblast with 99.2 percent, Dzhambulskaya Oblast with 86.4 percent, Karagandinskaya Oblast with 93.0 percent, Kzyl-Ordinskaya Oblast with 97.2 percent, Semipalatinskaya Oblast with 93.1 percent, Taldy-Kurganskaya Oblast with 91.6 percent, Ural'skaya Oblast with 84.6 percent, Chimkentskaya Oblast with 94.5 percent, Dzhezkazganskaya Oblast with 95.6 percent, and Mangyshlakskaya Oblast with 96.0 percent).

Distribution of the natural hayfields is still more uneven, generally in very low proportion compared to the natural pastures. In Chimkentskaya Oblast for example their proportion is only 1.4 percent while that of the pastures is 97.9 percent. The same is true of the other oblasts, where the proportion of natural hayfields varies between 2 and 5 percent, and only in Ural'skaya and Vostochno-Kazakhstanskaya oblasts do they reach 14 and 9 percent respectively.

Owing to this combination of natural fodder resources and their low productivity, most of the oblasts are suffering from an acute shortage of hay, which is sufficient for only 75 percent of their livestock. And when we consider the seasonal fluctuation depending on the botanical composition of the plants and the best times for their use, the chemical action and edibility of the plants at various seasons of the year, the geomorphology of the pasture areas, and the natural-geographic and soil conditions, it is evident that the republic requires immediate improvement of its natural fodder resources and artificial grass cultivation.

According to preliminary calculations only one-tenth (17-18 million hectares) of the pasturage can be radically or superficially improved. The total area of natural fodder resources (including hayfields) under cultivation amounts to 26-27 million hectares. In other words, no less than 2.6 million hectares (1) must be improved annually in a 10-year rotation.

To carry this out in practice it is first of all necessary to study the seasonal alternation of the vegetation on the main types of pastures and the changes in their fodder reserve, to ascertain the degree of distribution and the ecology of the best wild fodder plants, and to plan on this basis the most productive pasture rotations for the various farms, with a check on their effectiveness under production conditions.

In view of the complexity of the practical solution of this problem, we must rely upon the Kazakh Scientific Research Institute for the Meadow and Pasture Economy to do the main work on the foregoing questions.

Without internal economic land management, the sovkhozes and kolkhozes cannot rationally divide their pasturage into separate fields or plan their rational use by rotating pastures on an annual and seasonal basis.

Since land management operations are very laborious, require considerable capital investments and much time, and are beyond the capacities of the land management groups, we can recommend that the sovkhozes and kolkhozes carry out this measure by way of preliminary surveys with their own forces and on the basis of the existing plans, proceeding, on the basis of fieldwork to adjust pasture rotation to the nature of the fields, from the botanical composition of the natural vegetation and its nutritive properties, the fodder content (amount of edible substance and its edibility), seasonal nature of the herbage, swamping of the land and its total area, and the type of soil and topography of the separate sector.

The next stage of the operation consists of the planning and agrozootechnical substantiation of the pasture rotation system, as well as adjustment of the rotation to the nature of the fields.

Examples can be cited of pasture rotation systems, each of which requires the appropriate corrections and additions in accordance with the natural and economic features of the particular stock farms. For instance, the following are recommended for the mixed grass-grain pastures widely distributed in forest-steppe and temperate-arid steppe zones with widely developed milk-meat stock raising without seasonal winter pastures:

- Four-year pasture rotation: for the first field, summer pasturing on the grass left after hay mowing; for the second, spring and summer pasturing; for the third, fall pasturing with preliminary additional sowing of grass in early spring and summer; and for the fourth, rest with additional sowing of grain-leguminous grasses in early spring;

- Three-year three-field pasture rotation (on well-maintained grain-mixed grass herbage): for the first field, spring and fall pasturing; for the second, summer pasturing with additional sowing of grass in early spring; and for the third, fall pasturing on the grass left after early summer mowing for hay in the stage between the start of ear formation (budding) and the start of blossoming;

- Five-year five-field pasture rotation (in a shortage of summer-fall pastures, on solonetzes with prospects of conversion to meadow-pasture crop rotation): for the first field, plowing and sowing of mixed sweet-clover and grain grasses; for the second, hay mowing; for the third, summer-fall pasturing with preliminary additional sowing of grass in spring; and for the fourth, spring and summer pasturing with preliminary additional sowing of grass in early spring.

In the dry-steppe zone there are many composite lands in the fourth category that are used for pasturing and hay mowing. As much as 50 percent of them are on solonetzes requiring radical improvement. The rest of the area is used for pasturing various species of livestock. Winter pastures in this zone are lacking or small in size and make no great difference in the fodder reserve.

Accordingly the pasturing period here is limited to spring, summer and fall. The salt-free steppe pastures can be used productively only in spring and the first half of summer, and later only in the autumn period. The second half of summer is still difficult because the areas for summer pasturage are limited. Therefore in summer the livestock must be pastured on hayfields of the meadow type, and in some cases it is necessary to resort to cultivation of fodder crops in the form of a green assembly line.

For spring-summer feather grass-fescue or wormwood-grain steppe pastures, the five-field rotation is expedient: for the first field, spring-summer pasturing; for the second, fall pasturing with additional sowing of grass in spring; for the third, rest for natural seeding with fall pasturing; for the fourth, hay mowing with fall pasturing; and for the fifth, spring-summer pasturing.

Because of the seasonal nature of their herbage, which is good for foddering in the late fall period, pasture rotation is possible on solonetz lands only if they are converted to arable sectors with meadow-pasture crop rotations.

In case of radical improvement, the effective method is deep plowing without a moldboard to a depth of 35-40 cm with sowing first of sweet clover for green manure and then of mixed leguminous-grain grasses as a basis for meadow-pasture crop rotation. Among the grass mixtures, it is expedient to sow alfalfa-wheat grass, sweet clover-wheat grass, sweet clover-alfalfa-wheat grass and other mixtures.

For pastures with sandy or light sandy loam soils, a five-field pasture rotation is promising: for the first field, spring pasturing; for the second, summer pasturing; for the third, fall pasturing; for the fourth, rest with sowing of grasses; and for the fifth, summer-fall pasturing or use of the herbage for haylage.

Pastures in the semidesert zone are distinguished by their seasonal use and the great variety of their soils, from light-chestnut, gray-desert and brown to sandy ones.

Argillaceous semidesert pastures with ephemeral vegetation are to be considered the best spring pastures in this zone. For summer and summer-fall pasturing, hill and mountain locations, meadows of inlets and estuaries, and [illegible] and wormwood pastures should be used. Sand plains are to be considered the best winter pasturage.

Rational use of seasonal pastures should be based on the strip system of grazing with periodic rests of the various strips or sectors.

The desert zone is distinguished from the semidesert one by its more severe climate and low potential soil fertility. The variety of the natural vegetation is poorer here, and the latter is characterized by great sparsity, low nutritive content, and more pronounced seasonal use. Water sources suitable for livestock are extremely limited. But the principle of organizing use of seasonal pastures is the same as in the semidesert zone.

Allowing for vertical zoning, the mountain zone has six regions: foothill and steppe, [illegible]-1,600 meters above sea level, meadow-steppe (1,600-2,200 meters), subalpine (2,200-2,800 meters), Alpine (2,800-3,600 meters), and high mountain-desert steppe at 3,000-4,000 meters.

The whole area (20 million hectares) of the mountain zone, except for the foothill region, is used primarily for summer pastures and hayfields, and dry and irrigated farming are developed in the foothills alone. And in the steppe and meadow-steppe regions relatively few areas are suitable for farming and grass cultivation.

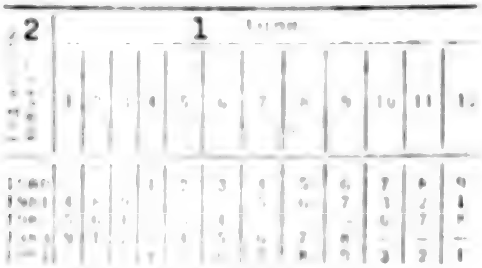
The pattern for use of mountain pastures is based on a sequence from the early spring period in the foothill region to the late summer one in the high mountain region. Accordingly pasture rotation is based on use of strips and driving the livestock alternately from the foothill pastures to the high mountain ones at the end of spring and in the opposite direction in the beginning of fall.

Pastures in the mountain zone can be rotated in the following 3-year cycle: for the first field, spring-summer pasturing; for the second, summer and early fall pasturing; and for the third, rest or hay mowing.

But no strong or stable fodder base is possible in the mountain zone unless the natural fodder resources are in full balance with field fodder production.

In Kazakhstan 32 million hectares of dry pastures are to be irrigated, and the existing installations for watering livestock are to be improved on 36 million hectares. In other words it is planned to radically reorganize 68 million hectares, or about one-third of the whole pasture area. Of course this will considerably strengthen the republic's grazing economy (4, 5). Yet the problem of its complete reconstruction will not be solved in this or the 11th Five-Year Plan. The total fodder supply from the whole irrigated pasture area, determined at 124 million hectares by the end of 1980, will come to no more than 37.2 million tons in terms of hay (based on its average yield of 3 centners per hectare). This will supply only 75-80 percent of the livestock planned for 1980. Therefore the pastures have to be improved even in the area that has been irrigated and is being radically and superficially improved. But even then the usable pasture reserve will not meet the requirement for the planned livestock, so that in the future the effort to irrigate the rest of the pasture area (55 million hectares) will have to be continued, inasmuch as the republic has large reserves of subterranean waters at great depths (8).

Example of Pasture Rotation System with 4-Year Grazing Cycle (with 12 Strips)


2
1
1
4
5
6
7
9
10
11

1. Strip 2. Year of use

Note: The figures indicate the grazing sequence of the various strips. The dashes indicate rests of the various strips.

Field fodder production is the second source of a strong fodder base. As noted above, it accounts for only 30 percent of the republic's present fodder reserve. About 10 million hectares are under fodder crops on arable land, including 5.4 million hectares under perennial grasses, [illegible].3 million hectares under ensilage crops (including 2.2 under corn), 1.8 million hectares under annual grasses, and 0.2 million hectares under root and tuber crops. This is close to 29-30 percent of all arable land under agricultural crops and 50 percent of such irrigated land not counting grain-forage crops. Meanwhile the productivity of the fodder crops under field crop rotation is still relatively low (2).

The present field fodder production in the republic is being developed unilaterally. Grain-forage and ensilage crops predominate in the sowings, while other physiologically necessary fodders, such as root and cucurbitaceous crops and cultivated grasses (especially leguminous ones) rich in albumins and vitamins are in very low proportion.

There is a particularly pronounced structural discrepancy in the areas under fodder crops near industrial centers, where the suburban truck and dairy sovkhozes and kolkhozes include such agricultural crops as sugar beets, winter wheat, tobacco etc. in their field fodder crop rotations.

Meanwhile the areas under alfalfa and root-tuber, cucurbitaceous, ensilage and other crops are reduced to a minimum, to say nothing of the green assembly line crops and cultivated pastures, which are practically nonexistent on these farms, having been replaced by poor natural pastures low in fodder production. Such farms usually have no specialized field fodder production, or no stock farm crop rotations or green assembly lines.

On the basis of the natural-economic conditions and specialization of the various farms, the organizational structure of field fodder production in the republic should be developed in three directions.

The first objective is highly intensive production of a wide range of fodder crops raised for ensilage, green fodder and the green assembly line, organization of cultivated pastures, and wide-scale use on arable land of mixed perennial leguminous and leguminous-grain grasses for hay and albumen-vitamin grass and haylage meal for the regions of suburban dairy cattle raising and [illegible] growing. In other words, the objective is characterized by development of field fodder production in the overall fodder reserve.

The second objective is ensilage-fodder production in the area of prevalence of meat cattle raising with sheep raising for meat and wool. It should occupy the whole area of arid dark chestnut and chestnut steppes and provide 50-[illegible] percent of the necessary quantity of fodders. Stall feeding of cattle and sheep in the winter period is impossible here unless large stores of ensilage, coarse fodders and grain forage are prepared. But projects to improve the pastures and their irrigation should be developed.

In the area of ensilage-fodder production, grasses must be cultivated extensively and seeds of perennial grasses must be raised to improve the natural fodder resources and field grass cultivation.

Cultivation of grain-forage and ensilage crops should be emphasized. This requires their careful selection so that the plants will be well adjusted to the local soil and climatic conditions and produce high and stable yields providing a rich albumen ration for the livestock. On the basis of the experience of the leading farms and the data of the scientific research institutions, the following promising fodder crops can be recommended. Forage crops: wheat grass, awnless brome grass, blue or yellow alfalfa, sainfoin and sweet clover; grain-forage crops: barley, millet, grain sorghum, chickpea, chickling vetch and partially peas; ensilage crops: sunflowers, sorghum and partially corn.

In order to improve the natural fodder resources, emphasis must be placed upon cultivation of the seeds of wheat grass, yellow alfalfa, sweet clover, sheep's fescue and other perennial grasses.

The third objective is hay-grain production in the area with developed sheep raising, located in the semidesert and desert regions of central, southeastern and southern Kazakhstan. The soil and climatic conditions of this area do not guarantee the formation of stable dry farming, but two yields a year can be obtained from the same plot on the irrigated lands. However the shortage of water is the main limitation of irrigation farming. In the future, oasis irrigation farming (for example, the Bazoyskiy irrigated area of 14,000 hectares in Alma-Atinskaya Oblast) can be developed here by use of the deep-lying subterranean waters and construction of special water reservoirs. Meanwhile the irrigation system should be directed toward preservation of the lands from secondary salination.

In the desert area the churots are of great practical importance (depressions with shallow deposits of ground waters) for raising fodder crops, as attested by the experience of the Trudovoy Pakhar' Kolkhoz of Sverdlovskiy Rayon of Dzhambulskaya Oblast. Annual and perennial grasses and all grain crops can be raised on the churots. Unfortunately there are not many such lands in the desert area. The dry farming lands, which in this area are subdivided into provided, semiprovided and not provided with water, should also be extensively used for fodder crops. They are widely distributed in the south and southeast of the republic.

Accordingly in the desert area with developed alternate-pasture stockraising, an almost complete lack of natural hayfields, and large areas of unproductive pastures, especially winter ones, field fodder production takes on vital importance to formation of reserves of hay and grain forage by use of the arable dry farming lands, churots and oasis irrigation lands (2, 3).

In 1977 about [illegible],000 hectares were irrigated with subterranean waters in the republic, with a reserve sufficient to irrigate up to 1.5 million hectares. Rational use of this resource is of the greatest importance to the national economy. The Kazakh Scientific Research Institute for the Meadow and Pasture Economy has organized the Division of Oasis Fodder Procurement, which is to prepare a system of oasis fodder procurement by 1985 for extensive introduction in the republic's agricultural production (1).

In conclusion I should like to point out that the republic's fodder potential will be considerably increased by radical and superficial improvement of the fodder resources (including hayfields) over an area of 26-27 million hectares and by a rational system of their use through introduction of pasture and hayfield rotations, irrigation of pastures over an area of 68 million hectares (which is one-third of the whole pasture area), and intensified field fodder procurement, namely adoption of fodder crop rotations, organization of cultivated pastures on arable land, expansion of oasis fodder production and other agricultural engineering measures.

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RESPONSIBILITY FOR DAMAGE TO AGRICULTURAL LIVESTOCK, EQUIPMENT

Compensation for Damage

Moscow SEL'SKAYA ZHIZN' in Russian 27 Nov 79 p 4

[Article by RSFSR Honored Jurist G. Dobrovol'skiy]

> [Text] "What is the amount of compensation for damage caused by sovkhoz workers and kolkhoz members in destruction and insuffiency of collectivized livestock?" A. Kurnambayev asks from Kalmytskaya ASSR.

According to general rule established by existing legislation, sovkhoz workers and kolkhoz members bear limited material responsibility for damage resulting from negligence on their part in the performance of work on a collectivized farm.

The amount of compensation for damage sought in such cases from sovkhoz workers may not exceed as a rule one-third of their monthly wage rate (salary) and from kolkhoz farmers--one-third of their basic monthly earnings.

These provisions on limitation of material responsibility cannot be applied in cases where damage to a farm is caused by destruction, deficiency or theft of neat cattle, pigs, goats, sheep or horses.

For the purpose of intensifying the struggle for safety of collectivized animal husbandry and compensation to kolkhozes and sovkhozes for losses arising from a lack of safety of livestock, the USSR Council of Ministers adopted a decree on 17 February 1954 "On the Material Responsibility of Persons Guilty of the Destruction or Theft of Livestock Belonging to Kolkhozes and Sovkhozes."

This decree established that persons guilty of the destruction of neat cattle, pigs, sheep, goats or horses belonging to kolkhozes or sovkhozes bear material responsibility for the full amount of the loss, that is, they must reimburse the farm for the full cost of the livestock that died through their fault or compensate for the physical loss by turning over to the kolkhoz or sovkhoz, with its consent, equivalent livestock.

The amount of the damage subject to compensation on the part of persons guilty of the destruction of neat livestock, pigs, sheep or goats, is determined in the amount of the one-time cost of this livestock expressed in purchasing prices and in the destruction of pedigreed or locally improved livestock--on the basis of prices for pedigreed or locally improved livestock. In regard to the destruction of horses, the amount of the damage is determined on the basis of their single cost in prices set by oblast (kray) ispolkoms and the republic Council of Ministers and in the case of destruction of pedigreed horses--according to prices of pedigreed horses.

Persons guilty of the theft of neat cattle, pigs, sheep, goats or horses belonging to kolkhozes and sovkhozes, in addition to criminal accountability, bear a greater material responsibility in the amount of one and a half times the cost of the livestock stolen by them expressed in corresponding prices (purchasing prices for pedigreed or locally improved livestock and prices for horses).

In this connection, increases in these prices must be taken into account.

Court practice bases itself on the fact that shepherds, cowherds or other sovkhoz or kolkhoz workers, who by reason of carelessness are responsible for missing neat cattle, pigs, sheep, goats or horses entrusted to them also bear a material responsibility in the full amount of the loss caused to the farm.

The above-mentioned provisions of full or increased material responsibility by workers of sovkhozes and members of kolkhozes apply only to cases of destruction, loss or theft of neat cattle, pigs, goats, sheep or horses.

In those instances where loss to a farm is caused by the destruction of poultry, rabbits or other animals not listed in the decree of the USSR Council of Ministers of 17 February 1954, the guilty persons as a rule bear limited material responsibility (sovkhoz workers--within limits not exceeding one-third of their monthly wage rate (salary) and kolkhoz members--within limits not exceeding one-third of their basic monthly earnings.

Responsibility for Equipment

Moscow SEL'SKAYA ZHIZN' in Russian 11 Dec 79 p 4

[Article by RSFSR Honored Jurist G. Dobrovol'skiy]

> In letters received by the editors, cases are reported of unauthorized use by chauffeurs, tractor operators and other persons of machines belonging to kolkhozes

> or sovkhozes. This results in breakdowns and damage to equipment and causes significant material loss to farms. Many readers have asked to be told what responsibility should be borne by persons guilty of unauthorized use of agricultural equipment.

In accordance with existing legislation, persons guilty of unauthorized use of agricultural equipment must bear strict responsibility.

The unauthorized use of tractors, motor vehicles or other agricultural machinery belonging to kolkhozes or sovkhozes constitutes a gross violation of the rules of internal order. For this guilty persons may be made answerable to disciplinary accountability or subject to measures of public suasion. If the unauthorized use of agricultural equipment is accompanied by spoilage or breakage of machines and has caused material loss to the farm, such a person, aside from application of measures of disciplinary or public pressure on him, is obliged to compensate the farm for the inflicted damage. In such cases, the rules on limitation of material responsibility of sovkhoz workers and kolkhoz members are not applied. Persons guilty of unauthorized use of agricultural equipment are under the obligation to compensate the farm for the inflicted loss in the full amount (paragraph 13 of the decree of the plenum of the USSR Supreme Court No 4 of 29 June 1979 "On the Practice of Use of Legislation by Courts in the Settlement of Dispute in Which One Side Is a Kolkhoz or Interkolkhoz Organization").

Persons who are not kolkhoz members or sovkhoz workers but are guilty of unauthorized use of agricultural equipment belonging to kolkhozes or sovkhozes and of inflicting material loss on a farm are obligated on the basis of Article 444 of the RSFSR Civil Code and pertinent articles of the civil codes of other union republics to compensate for it in the full amount. For recovery of loss, a sovkhoz initiates a suit against the guilty party in a rayon (city) people's court.

If motor vehicles or other means of transport belonging to kolkhozes or sovkhozes have been used by drivers for purposes of personal gain, the persons guilty of this may, on the basis of paragraphs 4 and 14 of the Ukase of the Presidium of the RSFSR Supreme Soviet of 19 June 1968 "On Increasing Administrative Accountability for Violation of the Rules of Driving on the Streets of Cities, Residential Centers and Roads and Rules of Use of Means Transport," be deprived of the right of operating transport for a period of up to one year or be fined in an amount of up to 30 rubles by decision of an office of the State Motor-Vehicle Inspectorate or a department (division) of the militia.

For the driving away of means of motor transport or other self-propelled machines belonging to kolkhozes or sovkhozes, persons guilty of this, in addition to material accountability may have criminal proceedings instituted against them. In accordance with Article 212-1 of the RSFSR Criminal Code and corresponding articles of the criminal codes of other union republics, driving away of means of motor transport or other self-propelled machines without the aim of stealing is punishable by deprival of liberty for a period of up to one year or with corrective work for the same period or with a fine of up to one hundred rubles or entails the application of measures of public suasion. The same acts committed again are punishable by deprival of liberty for a period of up to three years or corrective work for a period of up to one year.

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COMMENTARY ON DETERIORATING LIVESTOCK AND DAIRY SITUATION IN BELORUSSIA

Minsk SEL'SKAYA GAZETA in Russian 20 July 79 p 2

[Text] During the first half of the year in the republic the milk yield per cow was 21 km less than during the corresponding period of last year. All oblasts, with the exception of Minsk, did not fulfill the plan for the sale of milk to the state, and the total volume of its purchases was only 97 percent of the goal. Sixty-seven rayons did not fulfill the half-year goal of milk sales, and 63 rayons even reduced the State's purchases of milk to the level of last year. Worse than that, 670 farms, or 25 percent of the total number, did not fulfill the fixed plan for purchases of milk products. In Mogilevskaya oblast there were 161 such farms, and in Gomel'skaya there were 118.

The major claims should be made against the directors and specialists of the Gomel'skiy and Mogilevskiy oblast trusts of breeding sovkhozes, where the milk yield per head decreased by 120 and 46 km respectively.

At present there is still not enough concern for increasing the productivity of cows. For example, in the first 15 days of July all oblasts permitted the milk yields to drop.

And everything is not going well in the meat sector. Although 489,600 tons of meat were sold to the state by all categories of farms in the first half of the year, which is 7,700 tons more than last year, 24 rayons failed to fulfill the established plan. In the republic 739 farms of 27 percent of their number fail to meet the scheduled plan of livestock purchases.

It is unacceptable that not one oblast was able to cope with the goal of producing average daily weight gains in the raising and fattening of animals. Such rayons as Mstislavskiy, Kirovskiy, Belynichskiy allowed a drop in livestock weight gains of 320-400 grams, and in Cherikovskiy rayon the daily weight gain for cattle in June was only 149 grams.

The drop in productivity of the dairy herd and livestock being bred and fattened is a result of the fact that at a number of farms they were late in the transition of stock to pasturing, and they did not use green mass of winter rye at the right time.

Hardly anywhere were the possibilities of the pasture period used to their full extent. Conditions this summer are forcing us to tap the slightest/smallest untapped resources to increase the productivity of the dairy and meat herds, and approach solution of all problems with the greatest ingenuity. Many directors allude to the fact that the drop in productivity of livestock is an unavoidable consequence of the drought. However, wherever the organization of grazing has been given sufficient attention even unfavorable weather did not prevent the growth of livestock productivity.

Here is an example. At the collective farm "Rassvet" in Kopyl'skiy region they were not late in pasturing the animals on winter rye and cultivated grasses. Water was regularly hauled to the pastures. They apply mineral top dressing without fail. In order to reduce the negative influence of heat, they made timely changes in the daily schedule on the farms. From 1100 to 1600 hours the cows were kept in stalls where they received feed, and at 4 o'clock in the afternoon they were put out to pasture where they stayed until 2400 hours. As a result the cow's milk yield is now about 13 kg each day. "Tel'man" collective farm in Lepel'skiy rayon also increased its milk yields. Here they had prepared cultivated pastures since spring: mineral fertilizers were applied, they harrowed, they pastured the cattle rotationally, and they used electric fences for pasturing of the cows. The grass stand was always good, but nevertheless, the animals also received green mass daily in their stalls. The milk yields for the kolkhoz were about 14 kg per cow each 24-hour period.

At the same time many facts of a different nature can be cited. In Verkhnedvinskiy rayon 18 of 26 farms decreased the milk yield from cows, and in Iv'yevskiy rayon 11 farms of 21 decreased their yields. How could there be more milk at the sovkhoz "Zhemyslavl'" of Iv'yevskiy rayon when many dry cows are kept, the pastures are utilized unsystematically, on hot days the cows are allowed to go without water, even being deprived of it at night. And while the water pipes rusted through the directors of the sovkhoz did not lift a finger to repair them.

Another fact. At the kolkhoz "Leninskiy put'" of Krasnopol'skiy rayon there are essentially no cultivated pastures. The cows graze on swampy and bush-ridden lands. Of course in such cases feed is obligatory. But they did not think about sources for it on the farm. Such is the situation at a number of kolkhozes and sovkhozes of Kostyukovichskiy and Miorskiy rayons. At the Karl Marks and "Komsomolets" kolkhozes and at the "Gonchanskiy" sovkhoz of Klichevskiy region the animals pasture on meager pastures, scheduling of the day is not reviewed, not more than 8 kg of green feed is given daily per head. Therefore the milk yield does not exceed 7-8 kg.

What's the matter? The specialists know very well the techniques of summer maintenance and feeding of a milk herd, and they have the necessary recommendations but they ignore them.

The decrease of meat cattle at some farms is alarming. In Grodnenskaya oblast for example after 6 months there were 6,500 head less in comparison with the same period of last year. In other oblasts their number grew negligibly. In 15 rayon the number of cows decreased. In 84 rayons the number of pigs decreased. This is all a result of unsatisfactory organization of herd reproduction and a significant removal of young stock. In 6 months the yield of calves per 100 cows and heifers more than 2 years old was reduced by three head. Overall in the republic there was a deficiency of 23,000 calves, 103,100 suckling pigs and 4,300 lambs. The situation is further aggravated by the fact that the matter of insemination of the mother stock is unfavorable. In Brestskaya, Grodnenskaya and Mogilevskaya oblasts fewer cows and heifers were mated than in this period last year, and in Vitebskaya and Gomel'skaya oblasts fewer of the main sows and young pigs were mated.

The task consists in maximally increasing the stock of meat cattle and sheep and not permitting reduction of the swine stock. Above all there should be concern for the growth of the number of cows which are the basis of dairy livestock raising.

In the forefront there should be concern for fulfilling the state plans for purchases of livestock raising products. For these purposes, in addition to increasing the producitivity of cattle, it is necessary to assure a high quality of production. It should not be tolerated that the marketability of milk in the republic as a whole was reduced by 1 percent for the 6-month period, and in Gomel'skaya oblast it was reduced by 2 percent.

An important reserve for fulfilling the plans are purchases of surplus products of livestock raising from the population. Meanwhile not one oblast fulfilled the established assignment for purchase of livestock from the population.

There are also other failings. A system of centralized transport of livestock products is not operating efficiently everywhere. Specialized motor transport at depots of "Belmyasomoltrans" frequently stands idle because of breakdowns, lack of drivers, for organizational and other disorders. Supplying farms with milking equipment is extremely unsatisfactorily organized, and interruptions in technical maintenance and repair of farm machines, and in providing spare parts have been allowed by Goskomsel'khoztekhnika.

This year as never before there is an acute problem of supplying cattle with feed. In addition to this there must be concern for efficient use of feeds. The matter should be organized in such a way that not one kilogram ends up in a trough without having been processed, enriched by all possible methods. Here the decisive role belongs to the feed shops and the feeding areas. They should be put into order. The maximum amount of straw should be ground and put into silage together with other additives thus increasing its nutritiousness.

Directors and specialists of farms should not forget that one half of the pasturing period has already passed by. Today is important to thoroughly analyze the lessons of the first stage, eliminate the shortcomings, create a hard-working atmosphere in the collectives in order that each summer day bring more and more milk and other products of livestock-raising. Whatever is neglected in the summer cannot be compensated for later.

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BRIEFS

NEW WHEAT VARIETIES--Kiev, 9 Oct 79--Today the republic's kolkhozes and sovkhozes fulfilled the plan for the sowing of winter crops, which now occupy over 11.5 million hectares. This is more than last year. Four new varieties of wheat have been sown--Dneprovskaya-846, Zaporozhskaya Ostistaya, Mironovskaya-25 and Odesskaya Polukarlikovaya. There are also new varieties of rye and barley. All of them are more productive and of the intensive type. Granulated mineral fertilizers were applied simultaneously with the sowing of seed. [Text] [Moscow PRAVDA in Russian 10 Oct 79 p 2] 8228

ORGANIC FERTILIZER--Minsk--A dependable foundation for the future harvest was laid by the farmers of Belorussia. They moved the first 10 million tons of organic fertilizers into the fields of spring crops. [Text] [Moscow TRUD in Russian 2 Dec 79 p 1] 8228

SEED PREPARATIONS--Belorussian farmers have completed the accumulation of seeds for the winter fields, which today will increase to 1,250,000 hectares. The sowing material is being brought up to top condition. This work is concentrated in specialized enterprises, where mechanized complexes work at full capacity on a 24-hour basis. Special concern is being shown for rye, which is the basic crop in the grain fields. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 22 Aug 79 p 1] 8228

WINTER CROPS--Mogilev, 30 Aug 79--Over 190,000 hectares in the oblast will be occupied by winter crops that will be used for grain purposes. This is an increase of 23,000 hectares over last year. Almost all areas will be sown with the Belta rye variety, which is the most resistant to unfavorable weather conditions. There is a managerial approach to the future harvest in Bykhovskiy, Shklovskiy, Goretskiy and Mogilevskiy rayons. Special attention is being given to the fertilization of fields. Granulated mineral fertilizers are being applied primarily by the band method. Seed plots everywhere also receive a basic application of organic fertilizer. The oblast's enterprises have begun sowing winter crops. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 31 Aug 79 p 1] 8228

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